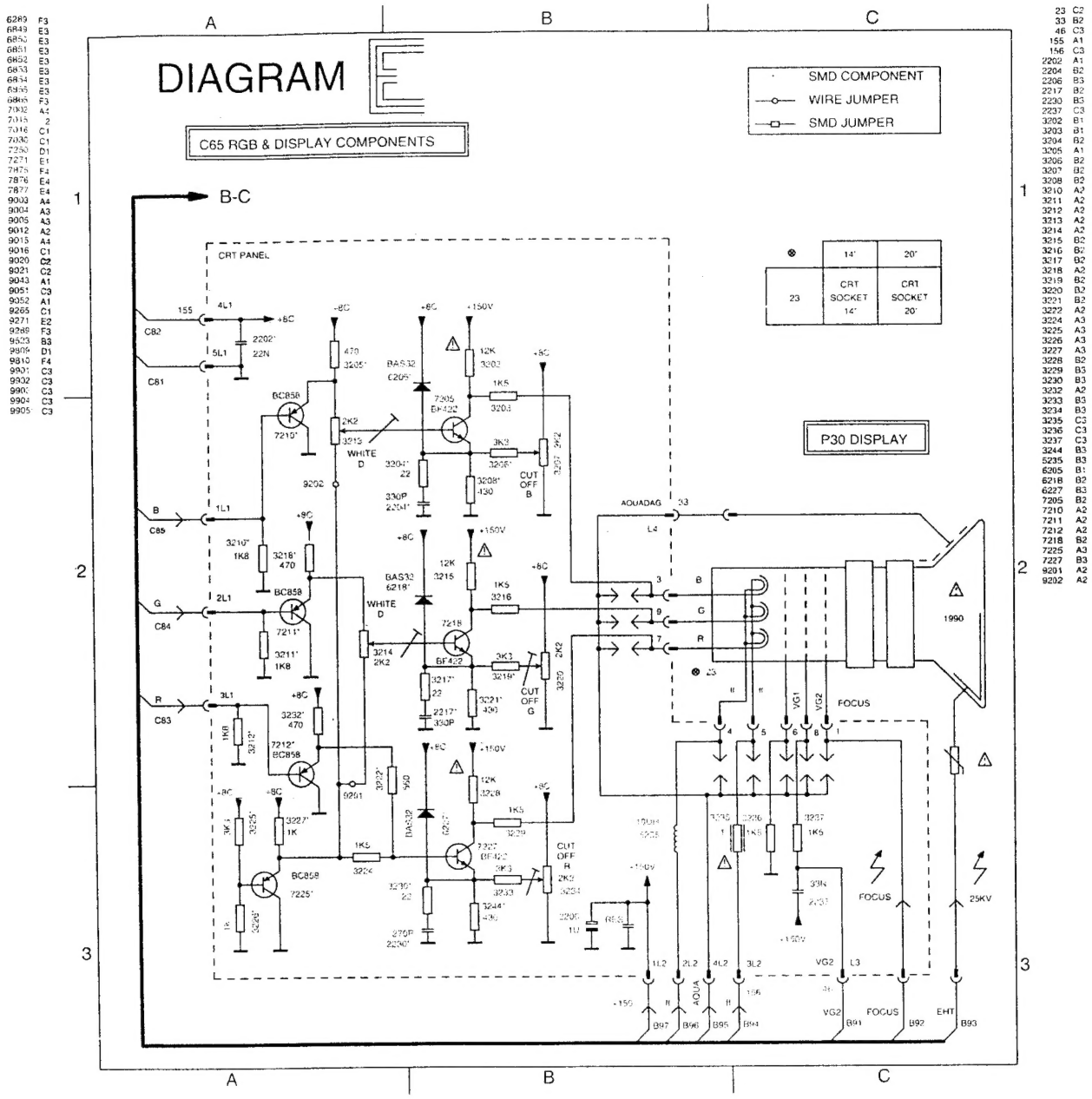
Service Manual

TV 377 AV
TV 386 VT



3130 106 3640.2

soggetto a modifiche

⊗	WITH SCART+A/V	WITHOUT SCART+A/V
3691	---	10K
7691	---	BC848

⊗	PANEL SHORT	PANEL LONG
25	----	T. SW
3666	SMD	I.R.
9603	----	JMP

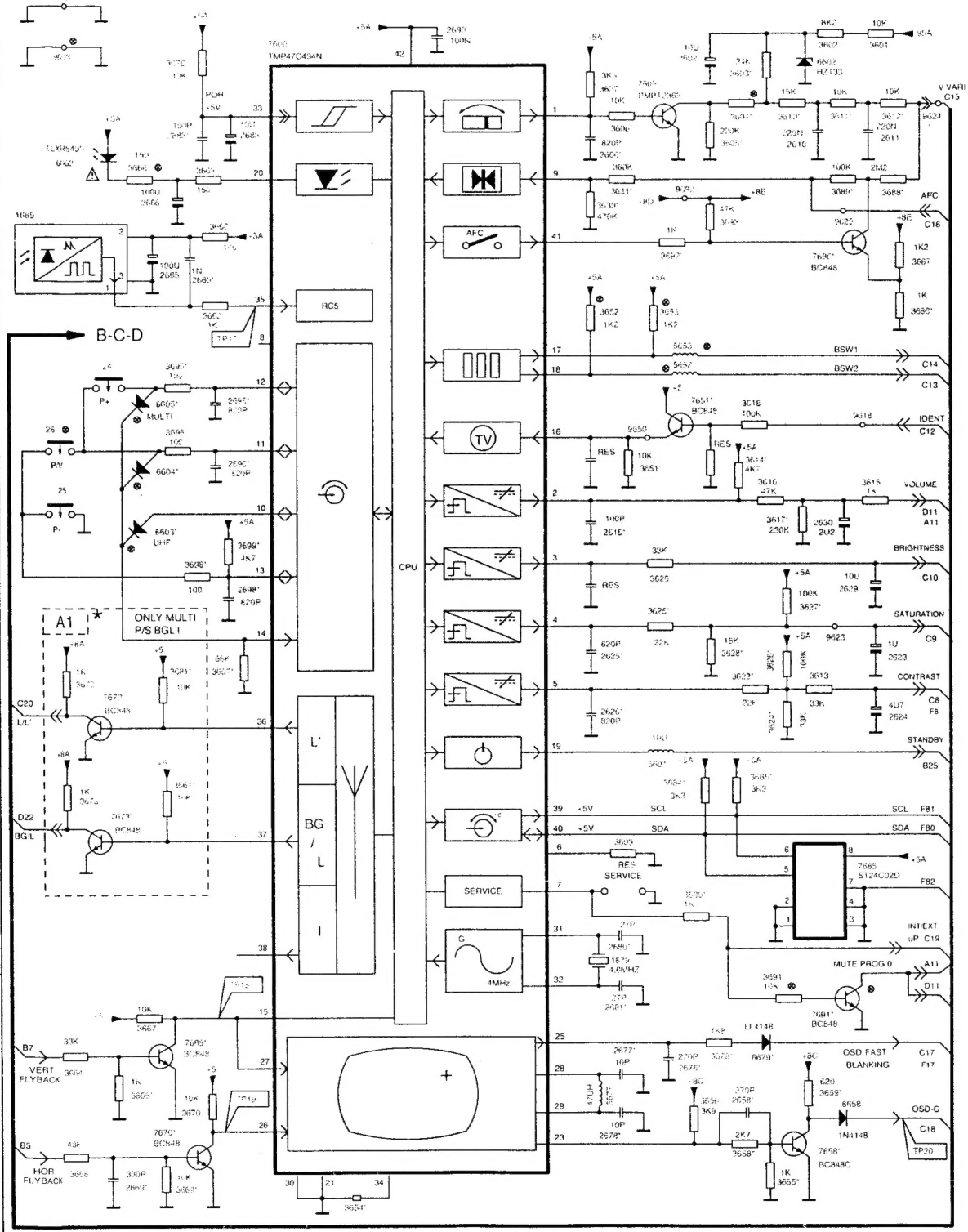
⊗	TXT	MULTI TXT
6604	LL4148	---
6605	---	LL4148

⊗	PAL BG	PAL I	PAL/SECAM BG-DK	PAL/SECAM I-BG-LL'
3604	150R	150R	150R	33R
5652	10uH	----	10uH	10uH
5653	10uH	----	10uH	10uH
6603	----	LL4148	----	----
6604	----	----	----	LL4148
6605	----	----	----	LL4148

DIAGRAM A

SMD COMPONENT
WIRE JUMPER
SMD JUMPER

G30 CONTROLS



Description IC7015/6A/6B/6C/6D/6E/6F (TDA836X)

IC7015 (TDA836X) is a single-chip video processor with built in IF-detector, luminance and chrominance separator, PAL chroma decoder, RGB processing, horizontal & vertical sync. processor, FM sound-decoder.

IF (INTERMEDIATE FREQUENCY) DEMODULATION (IC7015/6A)

IC7015/6A contains the IF amplifier and the IF detector. The 38.9 MHz IF signal is present at the output pin 17 of the tuner (33.4 MHz for a signal according to the SECAM L' system).

Bandpass filter: The IF bandpass charactenstic is determined by the bandpass of the SAW (Surface Acoustic Wave) filter 1015.

- For PAL BG sets a SAW filter with 5.5 MHz bandwidth is used (33.4 to 38.9 MHz).
- For PAL I sets a SAW filter with a bandwidth of 6.0 MHz is used (33.4 to 39.4 MHz).
- For PAL BGI/SECAM BGLL' sets a SAW filter with 6.0 MHz bandwidth is used to enable BGILL' recetion.
  For LL' reception BG/L is "high", D6014 conducts and so the 33.4 MHz is tuned to a lower frequency with C2014 (32.9 to 38.9 MHz).
  For BGIDK reception BG/L is "low", D6014 does not conduct. With C2013 the bandpass filter is tuned at 33.4 MHz (33.4 to 38.9 MHz).
- For PAL BG/SECAM BGDK sets a SAW filter with a bandwidth of 6.5 MHz is used without switching possibilities (32.4 to 38.9 MHz).

Demodulation and AGC: After the bandpass filter the IF signal is supplied to the IF-detector IC7015/6A pins 45 and 46. This IC7015/6A is suitable for both negative (BGIDK) and positive (LL') modulation controlled by the BG/L switching signal ("high" for LL' positive modulation, "low" for BGIDK negative modulation) or at the too sync level (negative modulation).
control also determines whether the AGC circuit controls at the top white level (positive modulation) or at the too sync level (negative modulation).
The high-frequency AGC voltage is available at pin 47. The take over level of the high-frequency (delayed) AGC control can be set at pin 49 by means of R3021. For switching to different IF for the SECAM L' system (33.4 MHz) the demodulation reference circuit 5040 at pins 2 and 3 IC7015/6A is switched by switching signal L/L'.

- For BGILDK reception L/L' is "low", D6042 conduct and so coil 5043 is connected in parallel to 5040. The circuit is tuned to 38.9 MHz.
- For L' reception L/L' is "high", D6042 does not conduct. The circuit is tuned to 33.4 MHz by L5040 only.

Note: For sets with LL' reception L5040 is tuned at 33.4 MHz, for sets without LL' recetion L5040 is tuned at 38.9 MHz (or 39.5 MHz for PAL I only sets).
Automatic Frequency Control (AFC) signal at pin 44 is obtained from the reference signal of the IF-detector and the control is modified internally in IC7015/6A for positive or negative modulation. C2037 smoothes the AFC voltage.

SOURCE SELECT, LUMINANCE AND CHROMINANCE SEPARATION (IC7015/6B)

Sound trap: The baseband CVBS signal of pin 7 IC7015/6A (nominal amplitude of $2V_{pp}$) also contains the 5.5 or 6.0 MHz FM sound signal (FM intercarrier sound). This sound signal is filtered out with a 5.5 MHz (6.0 MHz PAL I) ceramic filter (1032 and/or 1033). Source select: The CVBS signal is now fed to pin 13 IC7015/6B to the source selector switch in IC7015/6B. Pin 16 INT/EXT = 0V gives internal CVBS (pin 13), pin 16 INT/EXT = 8V gives external CVBS (pin 15) (external signal SCART CVBS IN from the CVBS IN cinch or pin 20 scart-connector). Luminance and chrominance separation: chrominance signal is filtered out (-20dB) by a luminance notch filter which is internally calibrated at the subcarrier frequency (4.43 or 3.58). The IDENT status signal is coming from pin 14 IC7015/6B. In case of no horizontal sync (so no signal detected) by the sync processor IC7015/6E, pin 14 IC7015/6B is made "low". TS7651 does not conduct so pin 16 of the uC is "low". In case horizontal sync detected (so signal detected) pin 14 IC7015.6B is "high", TS7651 conduct and pin 16 of the uC is "high". The IDENT signal is internally fed to IC7015/6D ensuring stable OSD even without transmitter signal (IC7015/6D can be switched to different time constants).

CHROMINANCE DECODING (IC7015/6C)

CVBS is extracted from the baseband CVBS signal from the IF-detector via crystals 1032 and/or 1033. PAL (and NTSC if applicable) chroma decoding inside IC7015/6C, SECAM chroma decoding inside IC7250.
Inside IC7015/6C the PAL (or NTSC) chroma signal is fed via amplification and a burst demodulator to the R-Y and B-Y demodulator. (PAL or NTSC processing is determined automatically by the burst demodulator inside IC7015/6C). The 4.43 MHz reference crystal for chrominance demodulation in IC7015/6C is present at pin 35 of IC7015/6C.
Pin 27 should be 5V5 (via R3280) to force IC7015 in the PAL/SECAM mode; by then IC7015/6C is in PAL decoding mode and via pin 27 feeds through the chroma signal to the SECAM chroma decoder IC7250 (so IC7015/6C searches for PAL and IC7250 searches for SECAM).
Via a bidirectional communication line between pin 32 of IC7015/6C and pin 1 of IC7250 both IC7015/6C and IC7250 "know" whether a PAL or a SECAM signal is detected:

- On AC level there is a 4.43 calibration for calibration of the PLL and chroma cloche filter of IC7250.
- On DC level there is a SECAM or PAL switching line enabling automatic selection of IC7015/6C or IC7250 to supply R-Y and B-Y to the delay line IC7271.
  - If IC7015/6C has detected a PAL signal, Vpin 32 is made 1V5. By then the demodulated R-Y and B-Y at output pins 30 and 31 of IC7015/6C are fed to the delay line IC7271.
  - If IC7015/6C has not detected a PAL signal, Vpin 32 is made 5V. By then the demodulated R-Y and B-Y at output pins 30 and 31 of IC7015/6C are not fed to the delay line IC7271.
  - If IC7250 has detected SECAM Vpin 1 IC7250 becomes "low". sinking typical 150 uA from the 5V from pin 32 IC7015/6C. Only in case the sinking current at pin 32 IC7015/6C is typical 150 uA, only by then IC7015/6C "knows" IC7250 has detected SECAM. The SECAM demodulated R-Y and B-Y are fed to the delay line IC7271 via output pins 9 and 10 of IC7250

RGB DEMATRIXING (IC7015/6D)

RGB-dematrixing dematrixes the -(R-Y), -(B-Y) and the Y signals to RGB signals; the sandcastle pulse coming from the IC7015/6E synchronises RGB dematrixing and suppresses the RGB signals dunng line and frame flyback.
Control by the µC for contrast, brightness and saturation (0V5 to 4V5).
RGB-source select switches between internal RGB and external RGB (OSD or SCART) via pin 21 of IC7015/6D (via resp OSD FAST BLANKING from OSD generator and FAST BLANKING from SCART or µP INT/EXT from µC).

HORIZONTAL SYNCHRONISATION (IC7015/6E) diagram B

Start up of the hor. oscillator via +11A gives start up current into pin 36; if voltage at pin 36 5V8 the hor. oscillator starts running at approx. 25kHz and only when IC7015 supply pin 10 = 8V the line frequency changes to 15625 Hz. Hor. sync. separator separates hor. pulses out of CVBS and so synchronises the free-running hor. sawtooth generator. Both the line and frame frequencies are internally locked to the chroma oscillator on pin 35 IC7015/6C. Hor. oscillator sawtooth is converted in square wave voltage with variable duty cycle (pin 37). Hor. flyback pulse at pin 38 compares phase of flyback pulse with phase of the hor. oscillator; if phase not correct the duty cycle of hor. oscillator will be adjusted. Time constant of the sync. circuit automatically determined by IC7015/6E. Pin 38 is both sandcastle output and hor. flyback input. Selection automatically determined by the input current (sandcastle a few uA, flyback 100-300 uA determined by R3371). Amplitudes of sandcastle pulse: burst 5V3, line blanking is 3V, frame blanking 2V. At standby (STANDBY "low") TS7580 blocks and TS7581 conducts and so the line is shut down at stand by.

VERTICAL (VERT.) SYNCHRONISATION (IC7015/6E) diagram B

Vert. sync. separator separates frame sync. pulses from CVBS signal and synchronises frame oscillator. IC7015/6E compares phase of flyback pulse with phase of sawtooth at pin 42 (from external RC network); if phase not correct the duty cycle of frame oscillator will be adjusted. Pre-amplifier in IC7015/6E amplifies sawtooth (pin 43 of IC7015/6E). Via BCI' frame correction is realised for high beam currents: if beam current increases (more white), EHT decreases so picture will become too big. BCI and so BCI' decreases for increasing beam current (diagram C) and the picture will be corrected.

SOUND DETECTION (IC7015/6F) diagram D

There are two audio paths: for the BG, I and DK systems FM modulated intercarrier sound (sound extracted from baseband CVBS from IF detector), for the LL' systems AM modulated quasi-split sound (sound extracted directly from the tuner).
FM demodulation: For FM modulated sound the sound signal is filtered through filter 1135 or 1136 from the baseband picture signal. For BGDK or BGILL' sets the switching signal BG/I is used to select the correct crystals.

- For I (or DK) reception BG/I is "low", TS7170 does not conduct, D6170 conduct and so crystal 1136 (6.0 MHz for I and 6.5 MHz for DK) is switched parallel to 1135.
- For BG reception BG/I is "high", TS7170 conduct, D6170 does not conduct and 1136 is not switched in parallel to 1135 (5.5 MHz only).
  For PAL BG or PAL I only sets only 1135 is used (resp 5.5 MHz or 6.0 MHz). FM-mono sound demodulation takes place in IC7015-6F. No adjustment required for BG or I demodulation as automatic PLL tuning (4.2 to 6.8 MHz). Sound frequency charactenstic is defined by de-emphasis C2112 at pin 1. Volume contol on DC level at pin 5. Selection between FM sound or AM sound/EXT sound (from input pin 6) by pin 16 IC7015/6B.

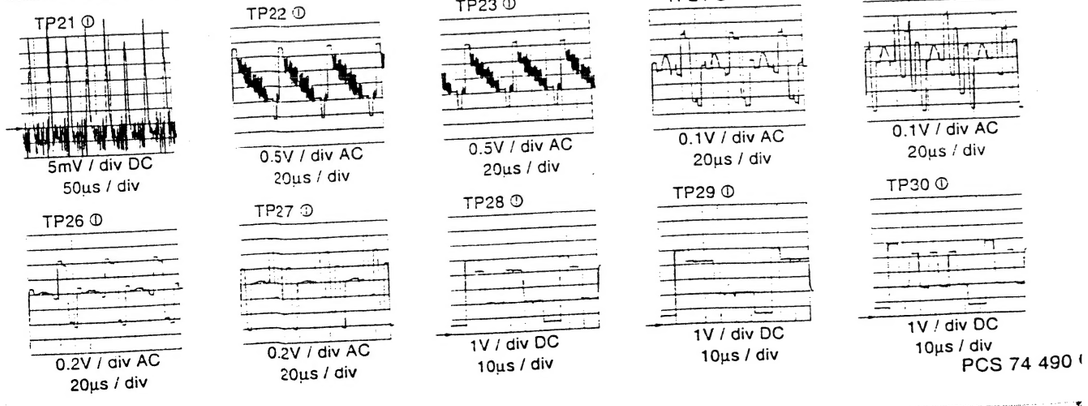
AM demodulation: Interference signals at 30.9 MHz are removed from the IF signal coming from the tuner by the bandstop filter 2102/5102 (Fig. 4.1). Via a double bandpass charactenstic filter 5104/5106 the required frequency spectrum is fed to the AM demodulation IC7125. The double charactenstic is necessary because for the L system the sound is at 32.4 MHz and for L' at 39.9 MHz switched by switching signal L/L'.

- For L' reception L/L' is "high", diodes D6115-6116-6119-6120 are not conducting. The frequency of the bandpass filter is now determined by C2110/2115 at 39.9 MHz.
- For BGILDK reception L/L' is "low", the diodes conduct and so the frequency is lowered through the adding of capacitors C2115 and C2120.

The demodulated signal at pin 6 of IC7125 is supplied to the source selection switch in IC7140. C2126 and 2127 are AGC related storage capacitors.
Source selection: INT/EXT is "low" for internal and "high" for external. This signal is made from uP INT/EXT and pin 8 of the scart. If one of these 2 signals is "high" external is selected. BG/L is "low" for FM sound (BGIDK) and "high" for AM sound (LL').

- Top switch in IC7140 selects between AM sound (pin 5) and EXT sound from SCART + AV (pin 3) by pin 9 INT.EXT. The output of this selector (pin 4 IC7150) is fed to input pin 6 of FM demodulator IC7015/6F. Here selection is made between FM sound and "pin 6 AM or EXT sound" by pin 16 IC7015/6B INT.EXT.
- Middle switch in IC7140 selects between AM (pin 1) and FM sound (pin 2) for SCART AUDIO OUT by pin 10 (BG/L is "high" for AM pin 1, "low" for FM pin 2).
- Bottom switch in IC7140 connects +8 to pin 1 IC7015/6F to switch the IF-detector and AGC (both IC7015/6A) to positive modulation for SECAM LL' (BG/L so pin 11 IC7140 is "high" for AM LL' positive modulation so pin 13 to +8).

Anti plop: At switching on the set C2183 is not charged, anode C2183 is "high", TS7183 conducts and so mutes the output amplifier IC7187. As soon as C2183 is charged anode C2183 is "low". TS7183 stops muting.
At switch off of the set the +8A drops very fast. As C2183 is still charged, the anode of C2183 becomes approx -8V DC. By then the DC volume control signal VOLUME is shorted via zener D6183, so IC7015/6F is muted



List of abbreviations

+11	+11 supply voltage for sound output amplifier
+11A	+11 supply voltage for start up of the line circuitry
+5	+5 supply voltage for pull up
+5A	+5 supply voltage for uC and EEPROM
+95	+95 supply voltage from the power supply to the line output stage
+95A	+95 supply voltage for the tuning (V VARI)
uC	Microcomputer
µP INT/EXT	Switching signal from uC to TS7876 and TS7877 (diagram C) making together with pin 8 of the SCART connector the INT/EXT switching signal; "low" for internal, "high" for external
AC	Alternating Current
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AM	Amplitude Modulation
AQUA	Aquadag on the CRT panel for spark gaps and used for making BCI signal
AV	Audio and Video cinches on the rear side of the set
BCI	Beam Current Info: If beam current increases the BCI signal decreases. BCI is used for contrast reduction if beam current is too high
BCI'	Derived from BCI: if beam current increases (more white), EHT decreases so picture will become too big. BCI and so BCI' decreases for increasing beam current (diagram C) and the picture will be corrected
BG/I	Switching signal from uC: "low" for I or DK reception (6.0 or 6.5 MHz FM sound), "high" for BG reception (5.5 MHz FM sound)
BG/I/DK/LL'	Sound system BG/I/DK/LL' indicate frequency distance between sound and picture carriers (5.5 MHz for BG, 6.0 MHz for I, 6.5 MHz for DK and LL')
BG/L	Switching signal from uC; "low" for BGIDK reception (negative modulation, FM sound), "high" for LL' reception (positive modulation, AM sound)
BRI	Brightness control signal (same as BRIGHTNESS)
BRIGHTNESS	Control signal (from uC, but on DC level via RC network) for brightness control of the video controller IC7015/6D
BSW1	Bandswitching signal from uC to 2 to 3 decoder IC7002
BSW2	Bandswitching signal from uC to 2 to 3 decoder IC7002
CONTRAST	Control signal (from uC, but on DC level via RC network) for contrast control of the video controller IC7015/6D
CRT	Picture tube
CVBS	Colour Video Blanking Synchronisation from pin 7 IF detector IC7015/6A
DC	Direct Current
EEPROM	Electrical Erasable Programmable Read Only Memory
EHT	Extra High Tension (25 kV)
FET	Field Effect Transistor
FF	Filatement (heater voltage)
FM	Frequency modulation
HOR FLYBACK	Horizontal flyback pulse (15625 Hz) used for locking the horizontal oscillator in IC7015/6E and for locking the OSD generator in the µC
HOR	Horizontal drive signal from IC7015/6E to line output stage
HUE	Tint adjustment for NTSC system
I^2C	Digital control bus of the microcomputer
IDENT	Status signal; "low" for no horizontal synchronisation, "high" in case horizontal synchronisation is detected
IF	Intermediate Frequency
INT/EXT	Switching signal derived from µP INT/EXT and pin 8 of SCART to pin 16 IC7015/6B and IC7140 (diagram D); "low" for internal, "high" for external
L/L'	Switching signal from µC: "low" for BGIDKL (picture at 38.9 MHz) reception, "high" for L' reception (picture at 33.4 MHz)
LED	Light Emitting Diode
LOT	Line Output Transformer
MUTE PROG 0	Only for sets without SCART + AV; "low" for program 0 muting the sound, "high" for programs 1-39
NIL	Non InterLace
NTSC	National Television System Committee
OSD	On Screen Display
OSD FAST BLANKING	Fast blanking info from OSD generator in µC to video controller IC7015/6D for blanking the RGB info to enable OSD-G insertion
OSD-G	Green info from OSD generator in µC to video controller IC7015/6D for inserting green OSD info on screen
PAL	Phase Alternating Lines
PLL	Phase Locked Loop
POR	Power On Reset (ensures the µC starts up it's software only if the power supply of the µC itself is high enough)
POS/NEG	Switching signal from IC7140 via BG/L; "high" for positive modulation (LL'), highohmic for negative modulation(BGIDK).
PP	Personal Preference
PROT	Protection signal from frame IC7400; in case vertical flyback generator in IC7400 is not activated, the voltage at pin 8 IC7400 becomes 2V. Protection circuit in IC7400 will make pin 7 "high" overruling the HOR FLYBACK and SANDCASTLE. The constant "high" sandcastle is supplied to the luminance circuit and so the picture will be blanked
PTC	Positive Temperature Coefficient resistor
RC5	Remote Control 5 system
RGB	Red Green Blue
ROM	Random Access Memory
SATURATION	Control signal (from uC, but on DC level via RC network) for saturation control of the video controller IC7015/6D
SAW	Surface Acoustic Wave: very precise bandpass filter
SC	Sandcastle signal from IC7015/6F to delay line IC7271 and SECAM chroma decoder IC7250
SCART CVBS IN	CVBS signal from pin 2 SCART to external input pin 15 IC7015/6B
SCART CVBS OUT	CVBS signal from IF detector IC7015/6A to pin 19 SCART
SCART AUDIO IN	Audio signal from SCART + AV cinches to source select IC7140
SCART AUDIO OUT	Audio signal from IC7140 to pin 1 and 3 SCART + AV
SCART	Euroconnector
SCL	Clock line of the I^2C-bus
SDA	Data line of the I^2C-bus
SDM	Service Default Mode: predefined mode for faultfinding (see chapter 8)
SECAM	SEquential Couleur A Memoire
SMPS	Switched Mode Power Supply
STANDBY	Switching signal; "low" for standby (only line is shut), "high" for normal operation
SYNC	Synchronisation
TP1	Test Point 1
UHF	Ultra High Frequency band from tuning range
V-IN	The DC voltage across C2505 present at pin 11 of the primary side of the transformer
V-VARI	Tuning voltage (0-30V)
VERT FEEDBACK	50 Hz vertical flyback pulse used for locking the vertical oscillator in IC7015/6E
VERT FLYBACK	50 Hz vertical flyback pulse from frame IC7400 to lock the OSD generator in µC
VERT DRIVE	Vertical drive signal from IC7015/6E to frame amplifier IC7400
Vg2	Voltage on Grid 2 of the picture tube
VHF	Very High Frequency band from tuning range
VOLUME	Control signal (from uC, but on DC level via RC network) for volume control of sound processing in IC7015/6F
VST	Voltage Synthesized Tuning
Y	Luminance part of the video signal

7. Electrical adjustments

1. Adjustments on the main panel (Fig. 7.1)

1.1 +95V power supply voltage
Connect a voltmeter (DC) across C2530.
Adjust **R3518** for a voltage of +96V5 for 14" or +94V for 20" sets at a black picture (beam current 0 mA).

1.2 Horizontal centring
Is adjusted with potentiometer **R3354**.

1.3 Picture height
Is adjusted with potentiometer **R3410**.

1.4 Focussing
Is adjusted with the focussing potentiometer in the line output transformer.

1.5 IF filter (only for sets with SECAM LL' reception possibility):
Connect a signal generator (e.g. PM5326) via a condensator 5p6 to pin 17 of the tuner and adjust the frequency for 33.4 MHz.
Connect an oscilloscope to pin 1 of filter 1015.
Switch on the set and select a program with system Europe (BG/L is "low" for BGIDK reception).
Adjust **L5012** for a minimum amplitude.

1.6 AFC

a. For sets with SECAM LL' reception possibility:
Connect a signal generator (e.g. PM5326) as indicated in point 1.5. Connect a voltmeter to pin 44 of IC7015/6A.

Adjust the frequency for 33.4 MHz and select a program with system France (L/L' is "high" for L' reception). Adjust **L5040** for 3V5 (DC).

Next adjust the frequency for 38.9 MHz. Select a program with system Europe (L/L' is "low" for BGILDK reception). Adjust **L5043** for 3V5 (DC).

b. For sets without SECAM LL' reception possibility:
Connect a signal generator (e.g. PM5326) as indicated above and adjust the frequency for 38.9 MHz (for PAL I at 39.5 MHz). Connect a voltmeter to pin 44 of IC7015/6A.
Adjust **L5040** for 3V5 (DC).

1.7 RF AGC
If the picture of a strong local transmitter is reproduced distorted, adjust potentiometer **R3021** until the picture is undistorted.

Or: Connect a pattern generator (e.g. PM5518) to the aerial input with RF signal amplitude = 1 mV.
Connect a multimeter (DC) at pin 5 of tuner. Adjust **R3021** so that voltage at pin 5 of tuner is 7V5 ± 0V5 (DC).

1.8 The AM sound section (sets with SECAM LL' reception possibility):
Connect pin 3 of IC7125 to a fixed voltage level of +2V DC by means of an adjustable power supply. Connect a signal generator (e.g. PM5326) via a condensator 5p6 to pin 17 of the tuner.

Adjust the frequency for 32.4 MHz and modulate (AM) the signal with 1 kHz.
Tune the set in the UHF band and select a program with system France (L/L' is "high" for L' reception).
First adjust **L5106** for maximum sound output.
Next adjust **L5104** for maximum sound output.

Adjust the frequency of the signal generator for 30.9 MHz and modulate (AM) the signal with 1 kHz.
Adjust **L5102** for minimum sound output.

Remove the power supply connection.

2. Adjustments on the CRT panel (Fig. 7.2)

2.1 Vg2 cut-off points of picture tube
Apply a pattern generator (e.g PM5518) and set it to a white raster pattern.
Adjust contrast and Vg2 at minimum (Vg2 with potentiometer in line output transformer to the left).
Adjust brightness until the DC voltage across potentiometer 3213 is 0V.
Adjust **R3207** (B), **R3220** (G) and **R3234** (R) for a black level of 115V on the collectors of transistors 7205, 7218 and 7227.
Adjust **Vg2** potentiometer until the gun that first emits light is just no longer visible. Adjust the two other guns with the respective controls (3207, 3220 or 3234) until just no light will be visible.

2.2 Grey scale (white D)
Apply a test pattern signal and adjust the set for normal operation. Allow the set to warm up for about 10 minutes.
Adjust **R3213** and **R3214** until the desired grey scale has been obtained.

8. Repair facilities

Test points

The CTT-H chassis is equipped with test points, TP1, TP2, etc in the service printing on the component side of the monoboard.
Using these test points it is possible to set a quick diagnosis on the top of the monoboard.

Functional blocks

On both the service printing on the copper and the component side, functional blocks are given. These blocks indicate the functionality of that specific part of the circuit.

Service Default Mode

The CTT-H software contains a "Service Default Mode".
To activate this mode the service pin of the microcomputer (pin 7-IC7600) should be short-circuited to earth while switching on the set with the mains switch (shorting pin 7 can be done on the copper side via the 2 copper squares or on the component side by pin 7 and the shielding of the µC). When the set in the Service Default Mode and "S" appears on the screen.
In the Service Default Mode the set is in a pre-defined mode. In this mode all analog settings (volume, contrast, brightness and saturation) are in the mid position and the set is tuned to program number 1.
The Service Default Mode is left via switching off the set by the mains switch or via standby on the remote control.

Error messages

The microcomputer also detects errors in circuits connected to the I^2C (Inter IC) bus. These error messages are communicated via OSD (On Screen Display) and a flashing LED.

Error message	Error description	Possible defective component
F1 on OSD and flashing LED	Internal µC error	IC7600
F2 on OSD and flashing LED	EEPROM error	IC7685

Note: After replacing the microcomputer first solder the shielding before testing the set. This is needed as the shielding is used for earth connection. If this is not done the set can switch into protection mode (see description of the SMPS).

CRT panel (Back view)

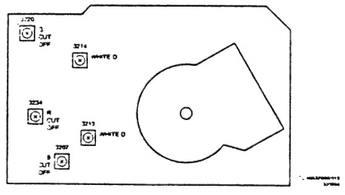


Fig. 7.2

Main carrier (Component side)

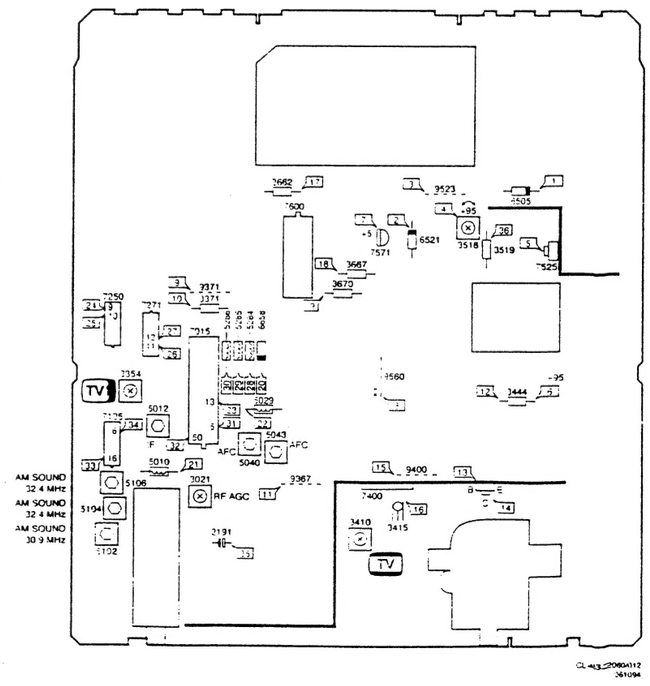


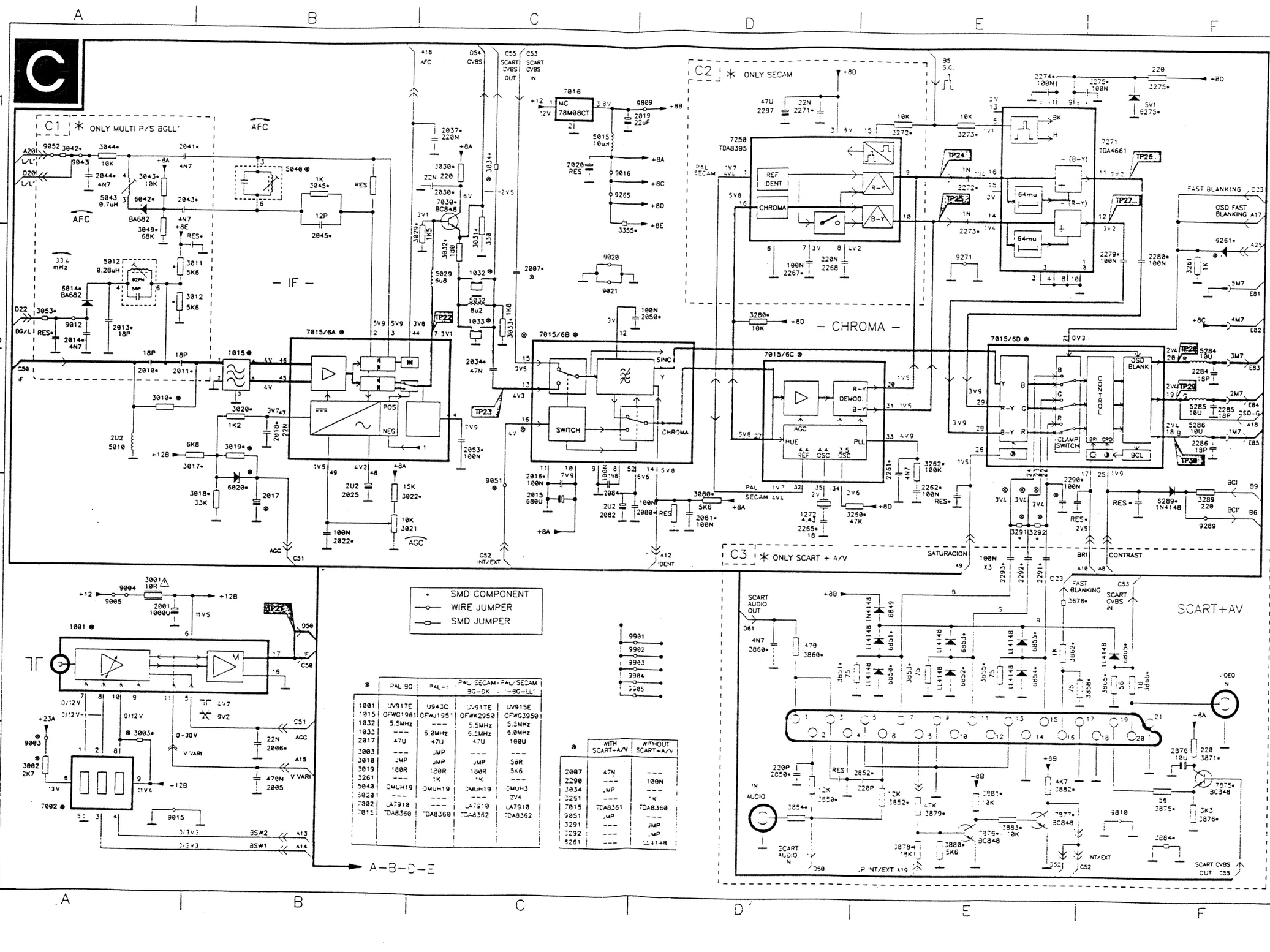
Fig. 7.1

Sound / Sonido / Suono

⊗	WITH SCART+A/V	WITHOUT SCART+A/V
2152	1U	---
3113	JMP	---
3123	JMP	---
3152	---	0R05
9114	JMP	---

⊗	WITH HEADPHONE	WITHOUT HEADPHONE
2191	100U	---
2192	10N	---
3190	68R	---
3191	68R	---
3193	---	JMP
3194	---	JMP
42	SOCKET	---

⊗	PAL BG	PAL I	PAL/SECAM BG-DK	PAL/SECAM I-BG-LL'
1135	5.5M	6.0M	5.5M	5.5M
1136	---	---	6.5M	6.0M
2170	---	---	---	10N
2171	---	---	0R05	4N7
3170	---	---	---	47K
3171	---	---	---	4K7
3172	---	---	---	4K7
3173	---	---	620R	620R
6170	---	---	0R05	BA682
7170	---	---	---	BC848

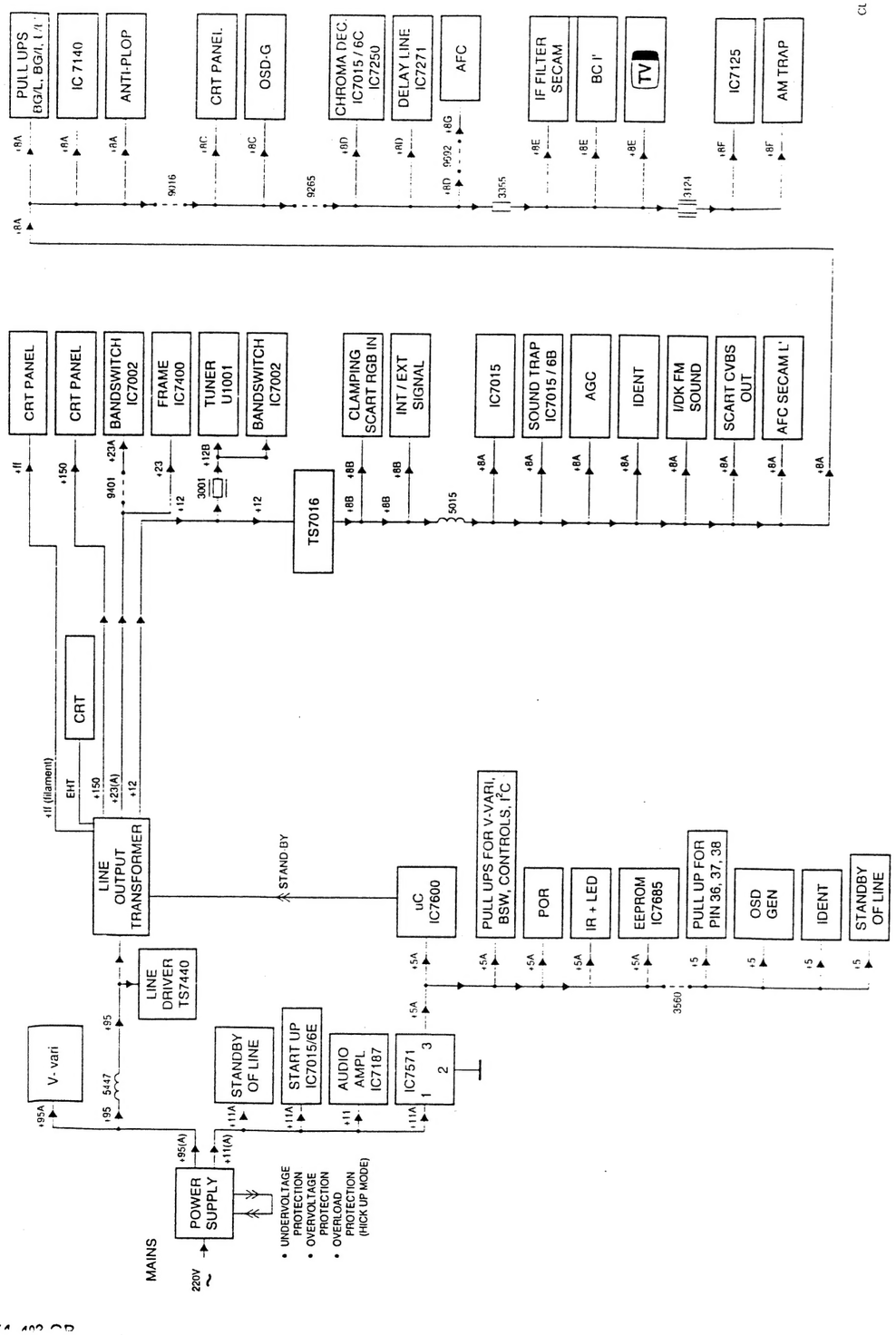


	PAL BG	PAL I	PAL SECAM 3G-DK	PAL/SECAM 3G-LL'
1001	UV917E	U943C	UV917E	UV915E
1015	OFWG1961	OFWJ1951	OFWK2950	OFWG3950
1032	5.5MHz	---	5.5MHz	5.5MHz
1033	---	6.0MHz	6.5MHz	6.0MHz
2017	47U	47U	47U	100U
3003	---	JMP	---	---
3010	JMP	JMP	JMP	56R
3019	180R	180R	180R	5K6
3261	---	1K	1K	---
5040	CMUH19	CMUH19	CMUH19	CMUH3
5828	---	---	---	2V4
7002	LA7910	---	LA7910	LA7910
7015	TDA8360	TDA8360	TDA8362	TDA8362

	WITH SCART+A/V	WITHOUT SCART+A/V
2007	47N	---
2290	---	100N
3034	JMP	---
3251	---	1K
7015	TDA8361	TDA8360
9851	JMP	---
3291	---	JMP
3292	---	JMP
5261	---	LL4148

Block diagram power supply

Power supply
block diagram



9. Directions for use

Installation

Follow the instructions very closely and step by step.
- This circle in front of a sentence indicates that you have to do something.
- This arrow in front of a sentence indicates the result of what you have done.

Text in italic like this one indicates help information.

Place the TV on a solid base.
Leave at least 5 cm around each side of the TV for ventilation.

The TV can only operate at a mains voltage of 220-240 V - 50 Hz; consult your dealer if the mains supply is different.

- Connect the TV tightly to the mains supply socket.
- Connect the aerial (indoor or outdoor) plug to the "ANT" socket on the back of the TV.

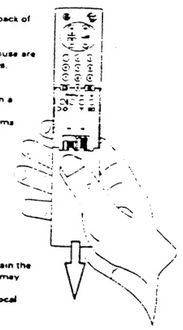
Make sure that the connection facilities to any TV installed in your house are in good condition. Only use good quality aerial connectors and cables.
The aerial plugs should be tightly connected.

Small screen TV's (14"/34 cm. and 15"/36 cm. TV's) are equipped with a high performance indoor aerial; nevertheless in some circumstances (specific regions or if surrounded by high buildings) reception problems could occur. Further improvement of reception could be obtained by:
- Rotating or varying the angle of the aerial.
- Using other aerial executions.
- Connecting your TV to an outdoor aerial.

Remote control

- Slide down the battery cover.
- Insert the batteries, as indicated on the remote control.
- Replace the battery cover.

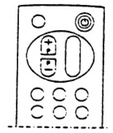
The batteries supplied with the remote control of your TV do not contain the heavy metals mercury and cadmium. In many countries flat batteries may not be disposed of with your household waste.
Please ensure that batteries are disposed of in accordance with any local regulations.



Switching TV on

- Press ⏻ on the front of the TV.
- The TV is switched on.

Is the TV still switched off? Then the TV is on Stand-by.
- Press P — or + or a digit button on the remote control, or — or + on the TV, to switch on the TV.



Stand-by

- By pressing ⏻ on the remote control you can temporarily switch the TV off.
- Press P — or + or a digit button on the remote control, or — or + on the TV, to switch on the TV again.

Automatic switch off

If after a period of 15 minutes no aerial signal is received, the TV automatically switches to Stand-by.

Televisions consume energy in the stand-by mode. Energy consumption contributes to air and water pollution. We advice you to switch off your TV overnight instead of leaving it on stand-by. You save energy and the picture tube is demagnetised which supports good picture quality.

Storing TV channels

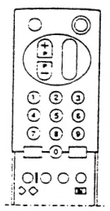
39 TV channels can be stored on program numbers.
Write down the TV channels and the assigned program numbers while storing.

Follow carefully steps **a, b, c, d.**

- Press the ◇ button.
- The current program number is displayed on the screen.

- Press ⊡ to start the search.
- The TV automatically searches until a TV channel is found.
- If you want to continue searching for a specific TV channel then press ⊡ again.

- Press P — or + or one or two digit buttons to select the program number (1 to 39) where you want to store the TV channel.
- The selected program number is displayed on the screen.



Program number 0 is not available to store TV channels.

- Press the ◇ button to store this selection.

Repeat steps **a, b, c, d,** until all the TV channels you require have been stored on program numbers.

Storing TV channels can be stopped by pressing first P + than ◇ on the remote control.

Auto Programming

The Auto Programming function can be used to find and store all available channels quickly. Channels are stored on program numbers in the same sequence as they are found.
After Auto Programming is started, the TV starts searching for a channel.
If a channel is found, it will be automatically stored on program number 1.
Searching will start again automatically. If another channel is found, it will be stored on program 2, etc.

At the end of the Auto Programming cycle the TV switches to program 1.

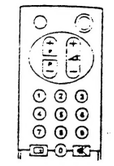
- Press the ◇ button.
- Press the ⊡ button longer than 4 seconds to start the Auto Programming.

The Auto Programming can be stopped by pressing first P + than ◇ on the remote control.

Operation

On Screen Display

The On Screen Display information allows you to see the program number on which a TV channel is stored, the sleep-timer status and a moving bar if the volume is adjusted.



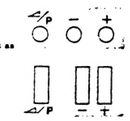
- Press ⊡ to display information on the screen.
- Press ⊡ again to switch off information.

Selecting TV channels

- Press P — or + or press one or two digit buttons on the remote control.
To select a program number from 1 to 9 press one digit button. To select a program number from 10 to 39 you must press two digit buttons in less than 4 seconds.
or
- Press — or + on the TV.

You cannot store TV channels on program number 0.
If you press the program number 0 a black screen appears.

Volume control

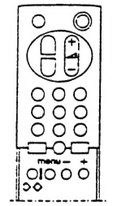


- Press ◿/P on the TV.
- A bar is displayed on the screen.
- Press — or + to adjust the volume.
4 seconds after you have adjusted the volume, the — and + buttons will work as Program — and + again.
or
- Press ◿ — or + on the remote control.

- Press 🔇 to switch off the sound.
- Press 🔇 again or ◿ + to switch on the sound.

Menu on screen

When you switch on your TV, the picture and sound settings have certain values. These values are initially stored by the factory. Using the menu on screen you can change these values. If you store these values the TV will switch on with your stored picture and sound values.



- Press MENU.
- **BRIGHTNESS** appears, adjust the brightness by pressing — or +.
- Press MENU again.

- **CONTRAST** appears, adjust the contrast by pressing — or +.
- Press MENU again.

- **COLOUR** appears, adjust the colour by pressing — or +.
- Press MENU again to switch off the menu.

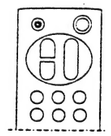
- Adjust the volume by pressing ◿ — or + on the remote control.

- If you went to store the settings press twice the ◇ button on the remote control.

If you went to leave the menu, for example after changing the contrast setting, you can either wait approximately 15 seconds or continue to press the MENU button until the menu disappears from the screen.

Sleep-timer

With this feature you can select a time period after which the TV switches automatically to stand-by mode.

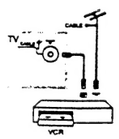


- Press ⏲ on the remote control until the required time after which the TV should switch off is displayed on the screen. This time period can be set in steps of 15 minutes starting from 90 minutes downwards. The count down starts immediately. You can see the remaining time by pressing ⊡ on the remote control.
During the final minute of the selected time period, the seconds remaining are automatically shown on the screen.
At the end of this time period the TV switches to stand-by mode.

If you want to stop the "Sleep-timer" press ⏲ until the selected time period displayed on the screen is "00".

Peripheral connections

Aerial connection



You can connect your videorecorder or other equipment via the aerial connection on the back of the TV.
- Unplug the aerial plug from your TV and insert it into the aerial input "IF" of your equipment.
- Connect another aerial plug to the output ⊠ of your equipment, connect the other side to the aerial input "IF" of your TV.
- Switch on your equipment.
- Check in the handbook of the particular equipment to see what the test signal looks like.
- Now, refer to the section Storing TV channels to search for and store this signal on a programme number. After that, you can receive signals from your equipment on this programme number.

Tips

To clean the TV
Clean the TV using a slightly damp chamois leather.
Never use aggressive cleaning agents.

Poor or no picture:
Are the plugs tightly connected to the aerial socket and are the connection facilities to any other installed TV in good condition?
Do you use good quality aerial connectors and cables?
If an indoor aerial is used, refer to the section "Installation" to improve the reception.

No solution:
Switch your TV off and on again with the ⏻ button.
Never attempt to repair a defective TV set yourself.
Switch off the TV and call your dealer or TV-technician when nothing helps or when:
- A white horizontal stripe appears across the whole screen.
- The red lamp below the screen starts blinking when no buttons are pressed on the remote control.

Environmental information
Your TV contains material which can be recycled and reused. At end of life specialized companies can dismantle the discarded TV to concentrate the reusable materials and to minimize the ammount of materiele to be disposed of.

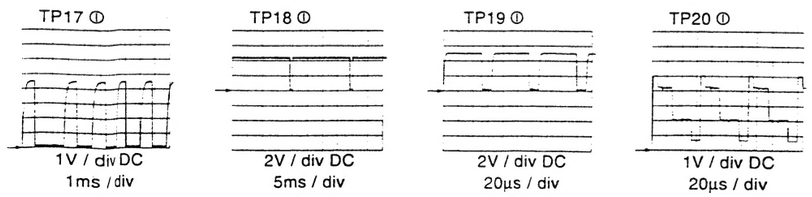
Description TMP47C434N

DESCRIPTION TMP47C434N (all pins described from left up corner anti-clockwise)

- +5 (pin 42) and Power On Reset (POR) (pin 33): The +5 supply of the microcomputer (µC) is at pin 42. Via the POR at pin 33 the µC will not initialize before C2683 at pin 33 is charged up to +5V (see description power supply). The initialisation will take place and the µC will start up.
- LED (pin 20): The LED at pin 20 will be red in the stand-by mode and will flash during RC5 reception or error messages.
- RC5 (pin 35): The commands transmitted by the remote control are received by the infrared receiver 1685 and applied to pin 35 of the µC.
- Operating keys and options diodes (pins 10-11-12-13-14): There are 3 operating keys connected to pins 10-11-12-13 of the µC. These pins are read every 16 msec. The given command can be determined by giving one of the pins a "low" level and reading the other pins whether they are "low" or not.
  By means of the option diodes between pins 10, 11, 12 and pin 14, the µC reads the system facilities of the unit during the initialisation phase. For PAL BG and PAL BG/SECAM BGDK no diodes are needed. For PAL I (UHF only) diode 6603 is present, for PAL BG SECAM BGLL' diode 6604 is present and for PAL BGI SECAM BGLL' diode 6605 is present.
- System switching voltages BG/L - L/L' - BG/I (pins 36-37-38): Pins 36, 37 and 38 are used for system switching in the sound and video decoding part.
  The signals at pins 36, 37 and 38 are inverted and set to the correct level by resp TS7672, TS7673 and TS7674. By then they are called status lines L/L', BG/L and BG/I (see table).

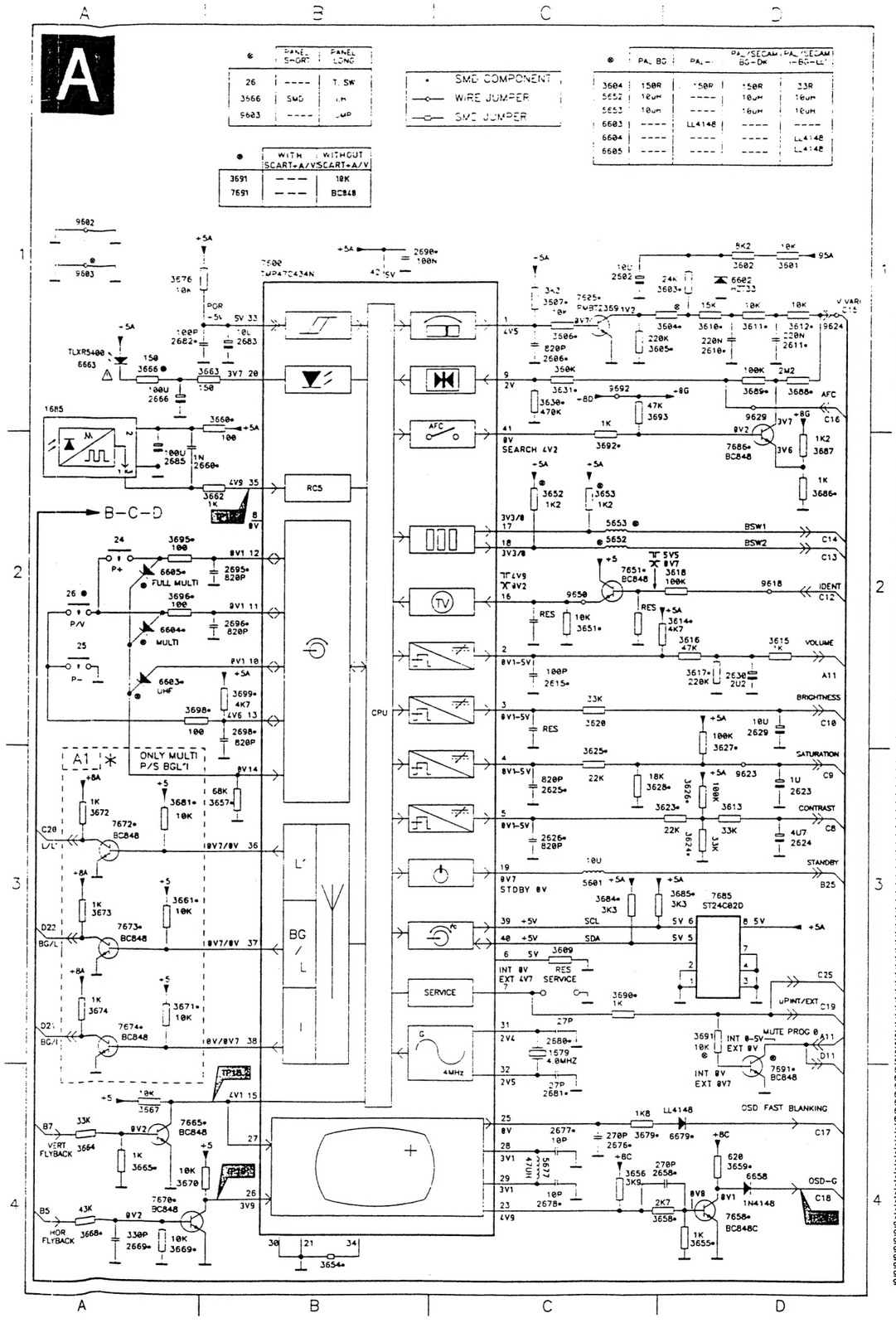
SYSTEM	L/L'	BG/L	BG/I
BG	L	L	H
I	L	L	L
DK	L	L	L
L	L	H	H
L'	H	H	H

- On Screen Display (OSD) (pins 15-27-26-23-29-28-25): Using the OSD generator, information is given on the screen about the tuned band (VHF or UHF), the position in the tuning range (tuning bar), system selected, sleep timer, program number and the adjustment of the various picture and sound settings.
  In order to synchronise the OSD information with the picture signal, the VERT FLYBACK signal is added inverted to pins 15 and 27 and the HOR FLYBACK signal to pin 26. The OSD generator is controlled by C2677, C2678 and L5677. The OSD FAST BLANKING signal is available at pin 25. The green OSD-G picture signal is coming from pin 23.
- 4 MHz oscillator (pin 31-32): The frequency of the oscillator (4 MHz) of the µC is determined by a crystal on pins 31 and 32.
- SERVICE: µP INT/EXT and MUTE PROG 0 (pin 7): If during mains switch on pin 7 is shorted to earth, the Service Default Mode is activated (see chapter 8).
  For sets with SCART + AV pin 7 is also used for internal or external audio + video switching. If pin 7 is "high" (via signal line uP INT/EXT) and/or pin 8 from SCART is "high", by then switching line INT/EXT is "high" (via TS7876 and 7877, see diagram C).
  If INT/EXT is "high", IC7015/6B (via pin 16) and IC7140 (via pin 9) will select external audio + video.
  For sets without SCART + AV pin 7 is also used for muting audio and video at program 0. At program 0 pin 7 will be "high" and so the DC volume control signal is shorted by TS7691. Further via signal line uP INT/EXT and D6261 the video controller IC7015/6D will select external RGB. This external RGB will be muted (dark screen) via R3291, R3292 and C2990 (TS7691, D6261, R3291, R3292 and C2990 are only present in sets without SCART + AV).
- EEPROM Memory and I²C (pins 39-40): The µC is connected to a non-volatile memory IC7685 (EEPROM) via the I²C bus. The PP and programme data are stored in this memory. The system has the facility to store 39 preferred transmitters together with their tuning, band voltage and system data.
- Stand-by (pin 19): The STANDBY switching signal is present at pin 19 of the µC. In case the status signal STANDBY is "low" the line output circuit is switched off.
- Picture and sound settings (pins 2-3-4-5): There are 4 analog settings available: volume (pin 2), brightness (pin 3), colour saturation (pin 4) and contrast (pin 5).
  The RC networks are used to make a DC voltage level from the pulse width modulated output signal.
  A certain adjustment of these settings can be preprogrammed in the memory as personal preference for all programs at once (PP).
  Sound suppression (mute) takes place internally in the µC during the automatic transmitter search or when the received signal is interrupted (detected via the IDENT signal at pin 16).
- Tuning (pins 16-17-18-41-9-1): The tuning system is of the VST (Voltage Synthesized Tuning) system type. This system is based on the principle that tuning to a transmitter in the tuner is done via a linear variation of the tuning voltage (V-VARI). This tuning voltage (0V2 to 5V) is available at pin 1 of the µC and is set to the correct level (0V to 33V) using TS7605 and the +95.
  The AFC (Automatic Frequency Control) signal from the IF-detector is added to the tuning voltage V-VARI via R3689 and R3688 to compensate tuner drift.
  During transmitter search pin 41 is "high" and as a result the AFC voltage will not be added to the V-VARI.
  If during the transmitter search an IDENT signal is received at pin 16, the µC will check via the input pin 9 whether the tuning is correct and whether the AFC can be switched on again.
  The µC has two switching voltages on pins 17 and 18 for band switching of IC7002.

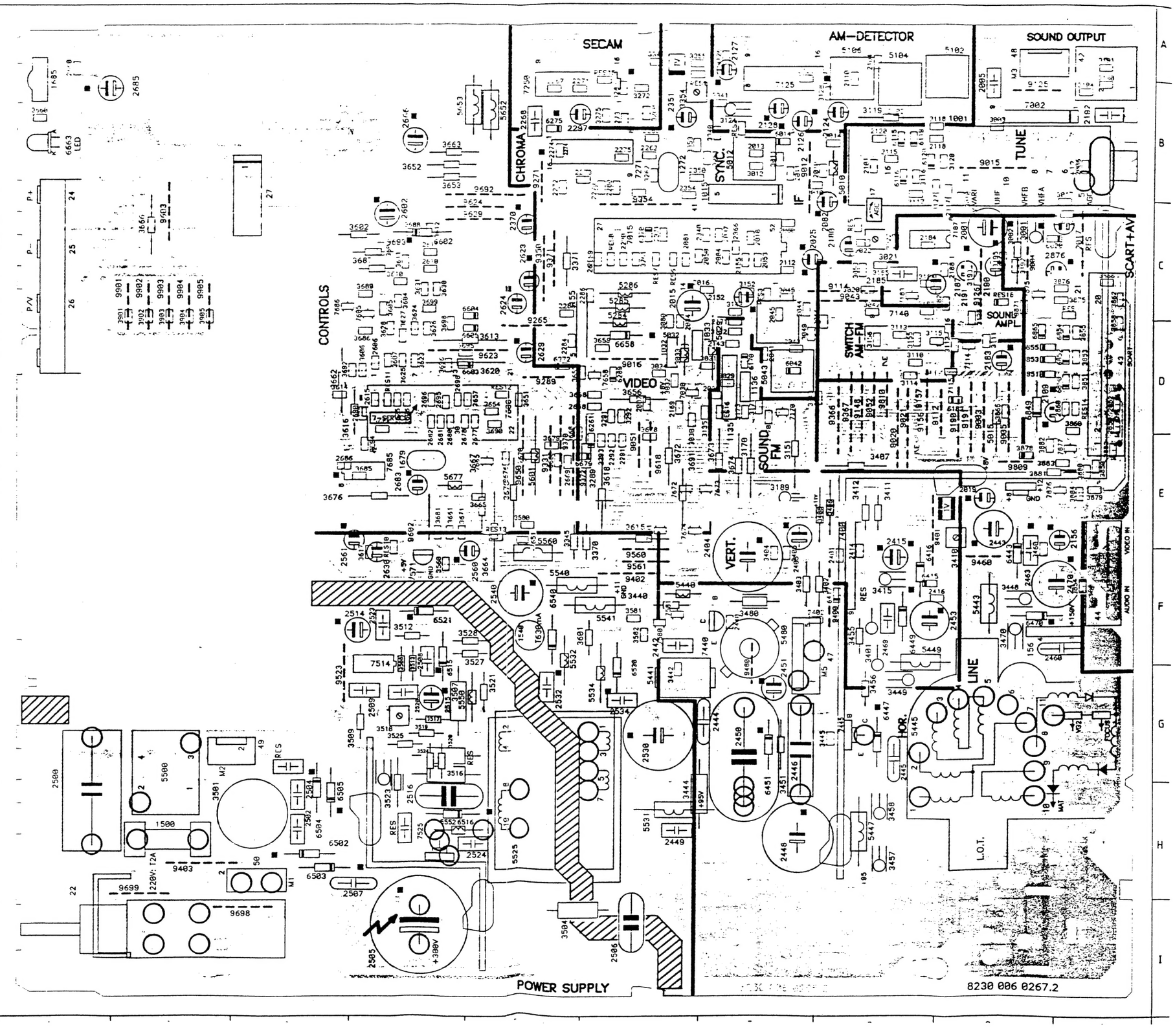


At RC5 reception

Controls



Main carrier / Panel principal / **CHASSIS CTT-H 6** Pannello principale



2460	F10	3195	C8	3676	E6	6649	D5
2462	F9	3260	B6	3675	E5	6650	D10
2469	F8	3261	C6	3681	E4	6651	D5
2470	F10	3262	B6	3684	D4	6652	D10
2500	G1	3270	B6	3685	E4	6653	D5
2502	H3	3273	B6	3686	D4	6654	D10
2504	H3	3275	B6	3687	C4	6655	D5
2505	I4	3280	B6	3688	C4	6665	D5
2506	I6	3285	E6	3689	C4	7002	A5
2507	H4	3291	D6	3690	D5	7015	C6
2508	F4	3292	D6	3691	E6	7030	D6
2509	G4	3340	B7	3692	D4	7114	D5
2514	F4	3341	B7	3693	C4	7115	D5
2515	G4	3342	A6	3695	D5	7125	B7
2516	H4	3345	E5	3696	D4	7140	D8
2520	G4	3351	B7	3698	D4	7170	D7
2523	F4	3353	B6	3699	C4	7183	C7
2524	H5	3354	B6	3852	E1	7187	C9
2530	G6	3355	A6	3853	D10	7250	B5
2532	G5	3370	E6	3854	F10	7271	B6
2534	G6	3371	C5	3855	D10	7400	E6
2540	F5	3401	F6	3855	C10	7440	F7
2560	F5	3402	F6	3856	E10	7445	G6
2561	F4	3403	F7	3860	D10	7514	F4
2582	C4	3404	F7	3862	C10	7525	H4
2606	D4	3405	F7	3865	D9	7571	F4
2610	C4	3406	E8	3866	C10	7580	F6
2611	C4	3407	E8	3871	C8	7581	F6
2615	D4	3408	E8	3875	C10	7600	D5
2623	C5	3410	F9	3876	C10	7605	C4
2624	C5	3411	E8	3878	E9	7651	E5
2625	D4	3412	E8	3879	E10	7665	E5
2626	D4	3415	F8	3880	E10	7670	E5
2629	D5	3440	F6	3881	E10	7672	E6
2630	F4	3442	G6	3882	E10	7673	E7
2658	D6	3444	H7	3883	E10	7674	E6
2660	A1	3445	G8	3884	E10	7685	E4
2666	B4	3448	F9	3901	C2	7686	C4
2669	E5	3449	G6	3902	C2	7691	E6
2676	E5	3451	G7	3903	C2	7875	C8
2677	D5	3455	F8	3904	C2	7876	E10
2678	D4	3456	G8	3905	C2	9003	D9
2680	D4	3457	H8	43	D10	9004	C9
2681	D4	3458	H8	5010	B8	9005	D9
2682	D4	3460	F9	5012	B7	9012	B7
2683	E4	3470	F9	5015	D9	9015	A9
2686	E4	3480	F7	5029	D7	9016	D6
2690	D4	3504	I5	5032	D6	9020	D8
2695	D4	3507	G4	5043	D7	9021	D8
2696	D4	3508	F4	5102	A9	9042	C8
2698	D4	3509	G4	5104	A8	9051	E6
2850	D10	3512	F4	5106	A8	9052	D8
2852	D10	3513	F4	5284	D6	9112	D9
2860	D10	3516	G4	5285	C6	9114	C8
2876	C9	3517	G4	5286	C6	9125	A9
3001	C9	3518	G4	5440	F6	9126	C9
3002	C9	3519	G4	5441	G6	9148	D8
3003	B9	3520	G4	5443	F9	9156	D8
3010	B8	3521	G5	5445	G8	9157	D8
3011	B7	3523	H4	5447	H8	9190	D9
3012	B7	3524	G4	5449	F8	9191	D9
3017	B10	3525	G4	5480	F7	9265	D5
3018	B9	3527	F5	5500	G2	9271	B5
3020	C7	3528	F5	5500	G5	9289	D5
3021	C8	3560	F4	5525	H5	9331	E5
3022	C7	3580	E5	5531	H6	9350	C5
3024	D6	3581	F6	5532	F5	9354	C6
3030	D6	3582	F6	5534	G6	9366	D8
3032	D6	3602	C4	5540	F5	9367	D8
3033	D6	3603	C4	5541	F6	9370	E5
3034	D6	3604	C4	5552	H4	9371	C5
3042	C7	3605	C4	5560	F5	9372	E5
3043	D8	3606	D4	5601	E5	9400	F8
3044	D8	3607	D4	5652	B5	9401	E8
3045	C7	3612	C4	5653	B5	9402	F6
3049	D7	3613	D5	5677	E4	9403	H2
3053	C7	3614	D3	6014	B7	9480	F7
3080	D6	3615	E6	6020	C8	9523	G3
3110	D8	3616	D4	6042	D7	9560	F6
3111	D9	3617	E4	6115	B8	9561	F6
3112	D9	3618	E6	6116	B8	9602	E4
3113	D8	3620	D5	6119	B8	9603	C2
3114	D8	3623	D4	6120	B8	9618	E6
3115	D8	3624	D4	6183	D9	9623	D5
3115	D8	3625	D4	6261	E6	9624	C5
3116	B8	3626	D4	6275	B5	9629	C5
3117	B8	3627	D4	6289	D6	9650	E5
3118	B8	3628	D4	6370	C6	9692	B5
3119	B8	3630	C4	6372	D5	9698	I3
3120	B9	3631	C4	6415	F8	9699	H2
3124	B7	3651	D5	6416	F8	9809	E9
3125	C8	3652	B4	6417	F8	9810	D8
3126	A7	3653	B4	6443	F9	9901	C2
3127	B8	3654	D5	6447	G8	9902	C2
3128	B8	3655	D6	6449	F8	9903	C2
3135	D7	3656	D6	6451	G7	9904	C2
3143	C7	3657	D5	6470	F9	9905	C2
3151	E7	3658	D6	6470	F9	M1	H3
3152	C7	3659	D6	6502	H3	M2	G2
3156	D8	3660	B1	6503	H3	M3	A9
3170	E7	3661	E4	6504	H3	M5	G7
3171	D7	3662	D3	6505	H3		
3172	D7	3663	B4	6515	F4		
3173	D7	3664	E5	6516	H4		
3182	C8	3665	E5	6521	F4		
3183	C7	3666	C2	6530	G6		
3184	C7	3667	E5	6540	F5		
3185	C7	3669	E5	6602	C4		
3189	E7	3670	E5	6603	D5		
3190	B10	3671	E4	6604	C5		
3192	C8	3672	E6	6605	D5		
3192	C8	3673	E7	6658	D6		
3194	A10	3674	E7	6663	B1		
3194	B10	3676	E4	6679	E6		

5. Overview oscillograms / Relación de oscilogramas / Rassegna oscillogrammi

TP1 ⏀
100V / div DC
5ms / div

TP5 ⏁
100V / div DC
20µs / div

TP12 ⏀
10V / div DC
20µs / div

TP19 ⏀
2V / div DC
20µs / div

TP26 ⏀
0.2V / div AC
20µs / div

TP1 ⏁ 300V DC
TP2 ⏀ 13V5 DC
TP2 ⏁ 12V DC

TP6 ⏀ 96V DC
TP6 ⏁ 114V DC
TP7 ⏀ 5V DC
TP7 ⏁ 5V DC

TP13 ⏀
2V / div DC
20µs / div

TP20 ⏀
1V / div DC
20µs / div

TP27 ⏀
0.2V / div AC
20µs / div

TP3 ⏀
5V / div DC
5µs / div

TP8 ⏀
2V / div DC
2µs / div

TP14 ⏀
100V / div DC
20µs / div

TP21 ⏀
5mV / div DC
50µs / div

TP28 ⏀
1V / div DC
10µs / div

TP3 ⏁
5mV / div DC
20µs / div

TP8 ⏁
2V / div DC
20µs / div

TP15 ⏀
10V / div DC
5ms / div

TP22 ⏀
0.5V / div AC
20µs / div

TP29 ⏀
1V / div DC
10µs / div

TP4 ⏀
20mV / div AC
5µs / div

TP9 ⏀
0.2V / div DC
20µs / div

TP16 ⏀
5V / div DC
5ms / div

TP23 ⏀
0.5V / div AC
20µs / div

TP30 ⏀
1V / div DC
10µs / div

TP4 ⏁
20mV / div AC
10µs

TP10 ⏀
2V / div DC
20µs / div

TP17 ⏀
1V / div DC
1ms / div

TP24 ⏀
0.1V / div AC
20µs / div

TP31 ⏀
20mV / div AC
0.5ms / div

TP5 ⏀
100V / div DC
5µs / div

TP11 ⏀
1V / div DC
5ms / div

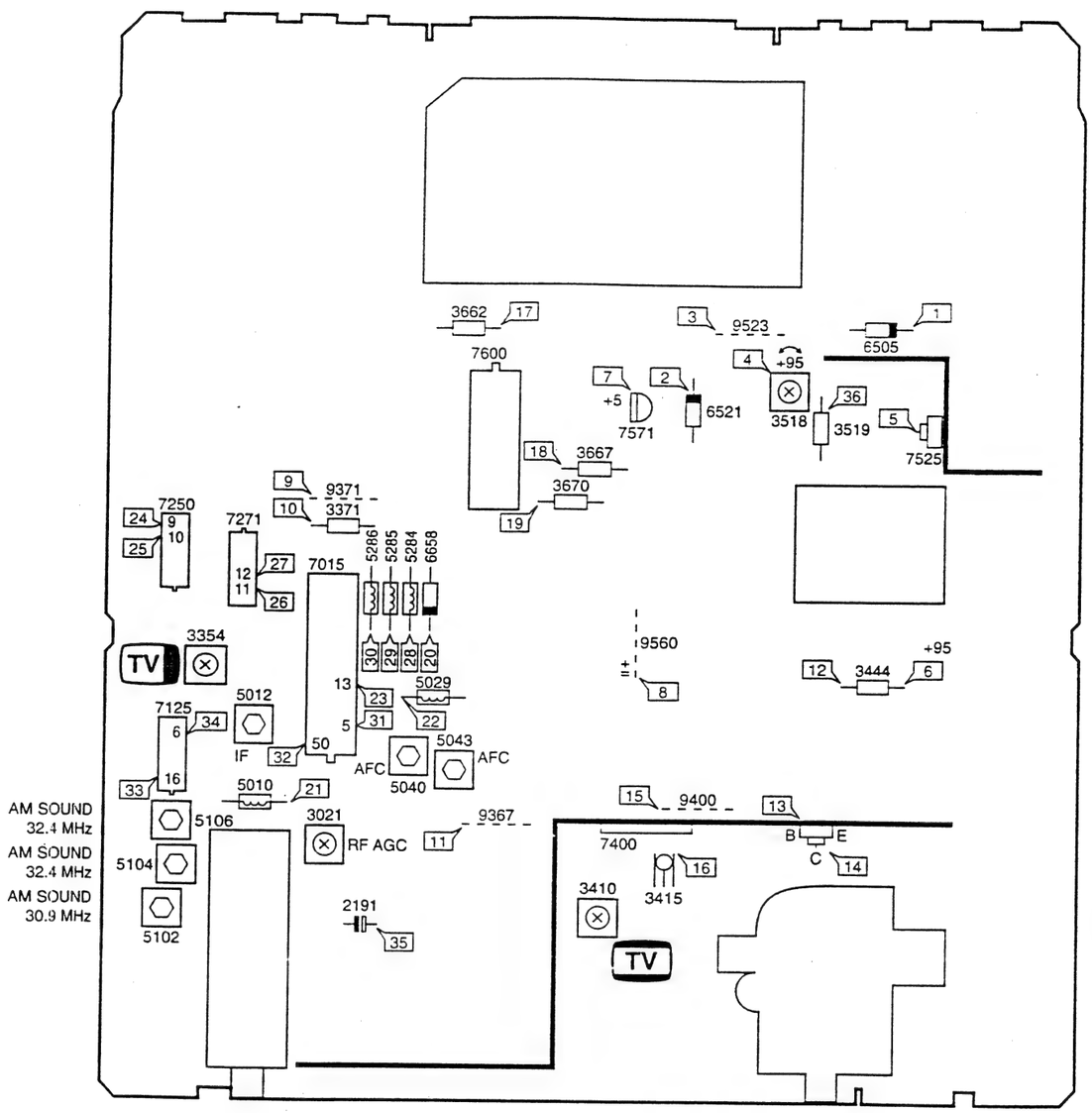
TP18 ⏀
2V / div DC
5ms / div

TP25 ⏀
0.1V / div AC
20µs / div

TP32 ⏀
20mV / div AC
0.2ms / div

Survey of testpoints / Puntos de prueba / Elenco punti di prova

Main carrier (Component side)



CL 46532060/012
061094

TP35 ⏀
0.5V / div AC
0.2ms / div

TP36 ⏀
0.5V / div DC
5µs / div

TP36 ⏁
0.2V / div DC
10µs / div

3. Safety instructions, maintenance instructions, warnings and notes

Safety Instructions for Repairs

1. Safety regulations require that during a repair:
   - the set should be connected to the mains via an isolating transformer
   - safety components, indicated by the symbol ⚠, should be replaced by components identical to the original ones
   - when replacing the CRT, safety goggles must be worn.

2. Safety regulations require also that after a repair:
   - the set should be returned in its original condition
   - the cabinet should be checked for defects to avoid touching, by the customer, of inner parts
   - the insulation of the mains lead should be checked for external damage
   - the mains lead strain relief should be checked on its function
   - the cableform and EHT cable are routed correctly and fixed with the mounted cable clamps in order to avoid touching of the CRT, hot components or heat sinks
   - the electrical resistance between mains plug and the secondary side is checked. This check can be done as follows:
     - unplug the mains cord and connect a wire between the two pins of the mains plug
     - switch on the TV with the main switch
     - measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
     - switch off the TV and remove the wire between the two pins of the mains plug
   - thermally loaded solder joints should be resoldered. This includes components like LOT, the line output transistor, fly-back capacitor.

Maintenance Instructions

It is recommended to have a maintenance inspection carried out periodically by a qualified service employee. The interval depends on the usage conditions.
- When the set is used in a living room the recommended interval is 3 to 5 years. When the set is used in the kitchen or garage this interval is 1 year.
- During the maintenance inspection the above mentioned "safety instructions for repair" should be carried out. The power supply and deflection circuitry on the chassis, the CRT panel and the neck of the CRT should be cleaned.

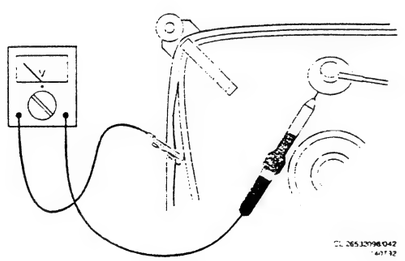


Fig. 3.1

Warnings

1. In order to prevent damage to IC's and transistors any flash-over of the EHT should be avoided. To prevent damage to the picture tube the method, indicated in Fig. 3.1, has to be applied to discharge the picture tube. Make use of an EHT probe and a universal meter (position DC-V). Discharge until the reading of the meter is 0V (after approx 30s).

2. ESD

   All IC's and many other semi-conductors are sensitive to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.

3. Proceed with care when testing the EHT section and the picture tube.

4. Never replace any modules or any other parts while the set is switched on.

5. Use plastic instead of metal alignment tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

6. Upon a repair of a transistor or an IC assembly (e.g. a transistor or IC with heatsink and spring) remounting should be carried out in the following order:
   1. Mount transistor or IC on heatsink with spring.
   2. Resolder the joints.

Notes

1. After replacing the microcomputer first solder the shielding before testing the set. This is needed as the shielding is used for earth connection. If this is not done the set can switch into protection mode (see description of the SMPS).

2. Do not use heatsinks as earth reference.

3. The direct voltages and waveforms should be measured relative to the nearest earthing point on the printed circuit board.

4. The direct voltages and waveforms are measured in the Service Default Mode (see chapter 8). Use a colour bar pattern of a pattern generator (e.g PM5518).

5. The DC voltages and oscillograms are where necessary measured with (┐┌) and without (┐ ┌) aerial signal (settings as in Service Default Mode; see chapter 8). Voltages and oscillograms in the power supply section have been measured for both normal operation (⏻) and in the stand-by mode (⏻). As an input signal a colour bar pattern has been used.

6. The picture tube PWB has printed spark gaps, each spark gap is connected between an electrode of the picture tube and the Aquadag coating.

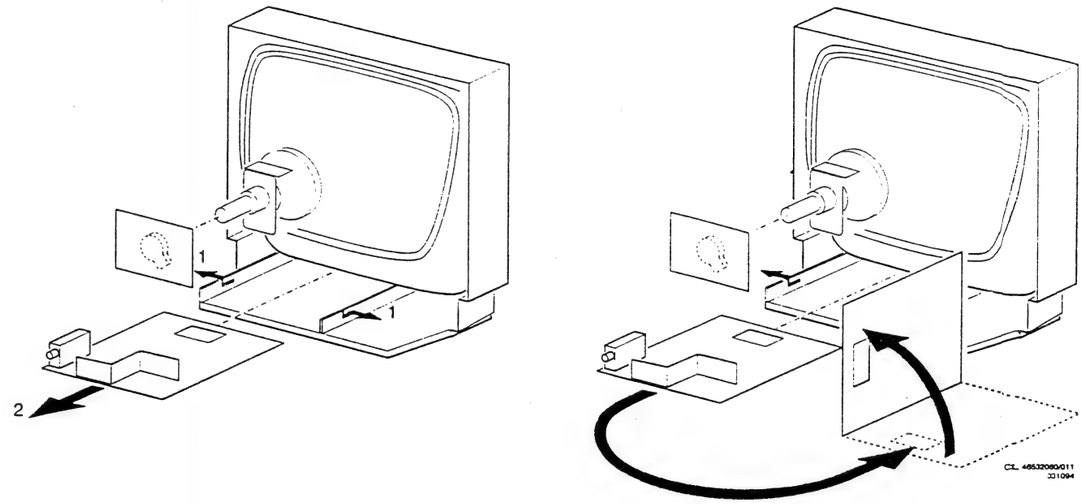
4. Mechanical instructions

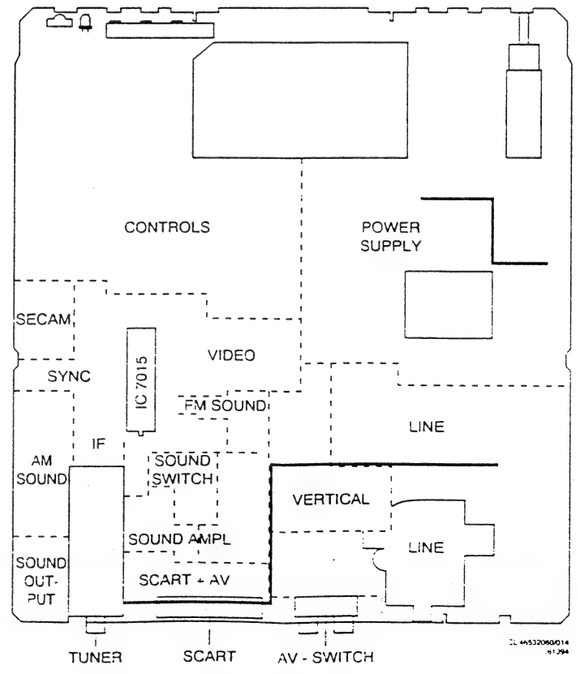
For the main carrier two service positions are possible:

A: For faultfinding on the component side of the main carrier
B: For (de)soldering activities on the copper side of the main carrier

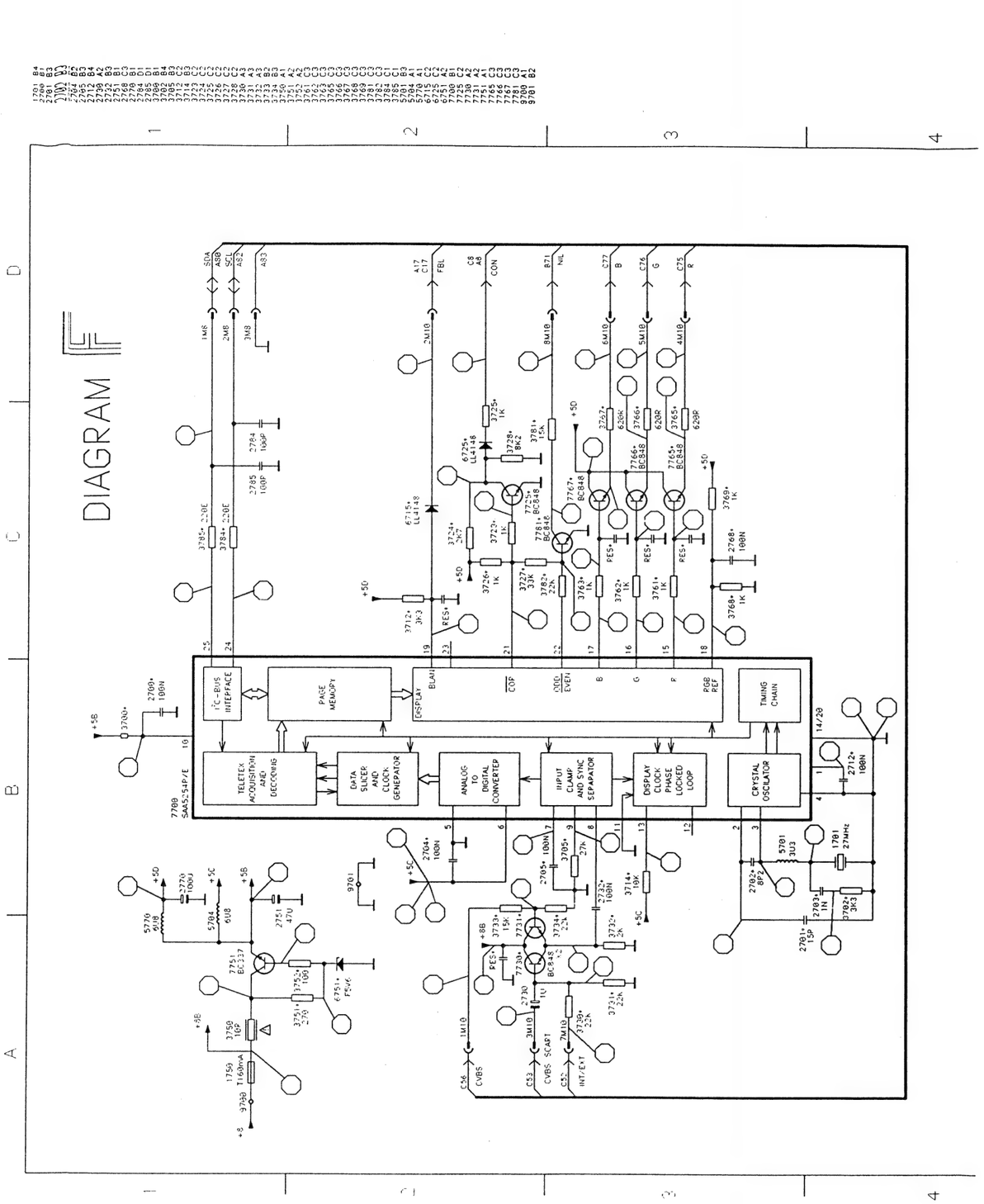
Position A can be reached by first removing the mains cord from it's fixation, then loosen the carrier lips (1) and then pulling the carrier panel (2) for approximately 10 cm.

Position B can be reached from position A after disconnecting the degaussing cable. Put the carrier on the line transformer side.





Functional block overview



10. Spare parts list / Lista de piezas de repuesto

Main panel [A/B/C/D]

Various

▲	4822 256 30274	Fuse holder
	4822 492 70559	Spring for transistor
▲	4822 256 91769	LED holder
0022	4822 276 13564	Mains switch
0025	4822 278 10125	3 knob control frame
0047	4822 265 40421	6 pins male grey
0048	4822 267 40666	3 pins male blue
0049▲	4822 265 30389	2 pins male yellow
0050▲	4822 265 40596	2 pins male yellow mains
1001▲	4822 210 10459	UV913IEC
1001▲	4822 210 10554	UV917 IEC
1001▲	4822 210 10464	U943C IEC
1015	4822 242 81403	OFWG1951M
1015	4822 242 81388	OFWG1961M
1032	4822 242 72211	5.5 MHz
1033	4822 153 30025	6.0 MHz
1135	4822 242 70714	5.5 MHz
1135	4822 242 71841	6.0 MHz
1272	4822 242 81879	4.43 MHz
1500▲	4822 070 32002	Fuse 2 A
1540▲	4822 071 56301	Fuse 630 mA
1679	4822 242 72579	4.00 MHz
1685	4822 212 23217	TFMS5360A IR receiver

⊣⊢

2001	4822 124 40201	1000uF 20% 16V
2005	4822 121 51252	470nF 5% 63V
2006	4822 122 31797	22nF 10% 63V
2015▲	4822 124 40199	680uF 20% 16V
2016	4822 122 33496	100nF 10% 63V
2017▲	4822 124 40433	47uF 20% 25V
2018	4822 122 31797	22nF 10% 63V
2019	5322 124 41431	22uF 20% 35V
2022	4822 122 33496	100nF 10% 63V
2025	4822 124 41585	2.2uF 20% 50V
2030	4822 122 31797	22nF 10% 63V
2034	4822 122 32542	47nF 10% 63V
2037	4822 126 13433	220nF 20% 50V
2045	4822 122 32139	12pF 2% 63V
2050	4822 122 33496	100nF 10% 63V
2053	4822 122 33496	100nF 10% 63V
2080	4822 122 33496	100nF 10% 63V
2081	4822 122 33496	100nF 10% 63V
2082	4822 124 41585	2.2uF 20% 50V
2084	4822 122 33496	100nF 10% 63V
2112	4822 122 32566	3.9nF 10% 63V
2143	4822 122 33496	100nF 10% 63V
2155	5322 122 31647	1nF 10% 63V
2169	4822 122 31839	82pF 2% 63V
2180	4822 124 40248	10uF 20% 63V
2183	4822 124 40248	10uF 20% 63V
2184	4822 122 32566	3.9nF 10% 63V
2185	5322 121 42661	330nF 5% 63V
2187▲	4822 124 41525	100uF 20% 25V
2188	4822 122 33496	100nF 10% 63V
2190▲	4822 124 41525	100uF 20% 25V
2261	4822 122 31784	4.7nF 10% 50V
2262	4822 122 33496	100nF 10% 63V
2265	4822 126 13434	18pF 2% 100V
2272	5322 122 31647	1nF 10% 63V
2273	5322 122 31647	1nF 10% 63V
2274	4822 122 33496	100nF 10% 63V
2275	4822 122 33496	100nF 10% 63V
2279	4822 122 33496	100nF 10% 63V
2280	4822 122 33496	100nF 10% 63V
2284	4822 122 31769	18pF 2% 63V
2285	4822 122 31769	18pF 2% 63V
2286	4822 122 31769	18pF 2% 63V
2290	4822 122 33496	100nF 10% 63V
2340	4822 122 33496	100nF 10% 63V
2350	4822 122 31784	4.7nF 10% 50V
2351	4822 124 41546	1uF 20% 16V
2354	4822 122 31644	2.2nF 10% 63V
2366	4822 122 31784	4.7nF 10% 50V
2370	4822 124 41546	1uF 20% 16V
2371	4822 122 31797	22nF 10% 63V
2401	4822 122 31771	390pF 2% 63V
2402	4822 122 32542	47nF 10% 63V
2404	4822 124 40432	1500uF 20% 25V
2405	4822 124 40283	33uF 20% 25V
2414	4822 122 31644	2.2nF 10% 63V
2415	5322 124 41431	22uF 20% 35V
2416	4822 122 32542	47nF 10% 63V
2440	5322 122 31642	330pF 2% 63V
2442	4822 122 40112	560pF 20% 500V
2443	4822 124 41545	220uF 20% 16V
2444	4822 121 43526	47nF 5% 250V
2445▲	4822 126 11382	1nF 10% 1KV
2446▲	4822 121 43061	8.2nF 5% 1.6KV
2448▲	4822 124 80096	47uF 200V
2449	4822 121 70162	10nF 5% 400V
2450▲	4822 121 42917	470nF 5% 200V
2451	4822 124 41736	10uF 20% 100V
2453	4822 124 41334	470uF 20% 35V
2460	4822 121 51385	33nF 20% 100V
2470	4822 124 81034	10uF 20% 200V
2500▲	4822 121 70285	470nF 10% 250V
2502▲	4822 126 11141	2.2nF 10% 1KV
2504▲	4822 126 11141	2.2nF 10% 1KV
2505▲	4822 124 42104	68uF 20% 385V
2506	4822 124 81035	47uF 50V
2508	4822 121 41857	10nF 5% 250V
2509	4822 121 70376	3.9nF 5% 400V
2514	4822 124 81035	47uF 50V
2515	4822 124 41546	1uF 20% 16V
2516▲	4822 126 11141	2.2nF 10% 1KV
2520	4822 122 31316	100pF 2% 100V
2523	4822 121 42408	220nF 5% 63V
2524▲	4822 126 11382	1nF 10% 1KV
2530▲	4822 124 80096	47uF 200V
2532	4822 122 31177	470pF 10% 500V
2534▲	4822 126 11382	1nF 10% 1KV
2540▲	4822 124 40199	680uF 20% 16V
2560	4822 124 41546	1uF 20% 16V
2561	5322 124 41431	22uF 20% 35V
2602	4822 124 40248	10uF 20% 63V
2606	4822 122 31974	820pF 10% 63V
2610	4822 126 13433	220nF 20% 50V
2611	4822 126 13433	220nF 20% 50V
2615	4822 122 31765	100pF 2% 63V
2623	4822 124 41546	1uF 20% 16V
2624	4822 124 41532	4.7uF 20% 50V
2625	4822 122 31974	820pF 10% 63V
2626	4822 122 31974	820pF 10% 63V
2629	4822 124 40248	10uF 20% 63V
2630	4822 124 41585	2.2uF 20% 50V
2658	4822 122 32142	270pF 2% 63V
2660	5322 122 31647	1nF 10% 63V
2666▲	4822 124 41525	100uF 20% 25V
2669	5322 122 31842	330pF 2% 63V
2676	4822 122 32142	270pF 2% 63V
2677	4822 122 31971	10pF 2% 63V
2678	4822 122 31971	10pF 2% 63V
2680	4822 122 31825	27pF 2% 63V
2681	4822 122 31825	27pF 2% 63V
2682	4822 122 31765	100pF 2% 63V
2683	4822 124 40248	10uF 20% 63V
2685▲	4822 124 41525	100uF 20% 25V
2690	4822 122 33496	100nF 10% 63V
2695	4822 122 31974	820pF 10% 63V
2696	4822 122 31974	820pF 10% 63V
2698	4822 122 31974	820pF 10% 63V

⊣⊢

3001▲	4822 052 10109	10Ω 5% 0.33W
3002	4822 116 52263	2k7 5% 0.5W
3003	4822 051 10008	0Ω 5% 0.25W
3010	4822 051 10008	0Ω 5% 0.25W
3017	4822 051 56802	6k8 1% 0.125W
3018	4822 051 10333	33k 2% 0.25W
3019	4822 051 10181	180Ω 2% 0.25W
3020	4822 051 51202	1k2 1% 0.125W
3021	4822 100 11483	10k 30% 0.1W
3022	4822 051 51503	15k 1% 0.125W
3029	4822 051 10152	1k5 2% 0.25W
3030	4822 051 10221	220Ω 2% 0.25W
3031	4822 051 10331	330Ω 2% 0.25W
3032	4822 051 10181	180Ω 2% 0.25W
3033	4822 051 51302	1k8 1% 0.125W
3045	4822 051 51002	1k 1% 0.125W
3080	4822 051 10562	5k6 2% 0.25W
3135	4822 051 10008	0Ω 5% 0.25W
3143	4822 051 51002	1k 1% 0.125W
3151	4822 116 80175	4k7 5% 0.5W
3182▲	4822 051 10103	10k 2% 0.25W
3183▲	4822 051 10103	10k 2% 0.25W
3184	4822 051 54722	4k7 1% 0.125W
3185	4822 051 56202	6k2 1% 0.125W
3189▲	4822 052 11258	2Ω 5% 0.5W
3192	4822 051 51004	100k 1% 0.125W
3193	4822 051 10008	0Ω 5% 0.25W
3194	4822 051 10008	0Ω 5% 0.25W
3250	4822 051 54703	47k 1% 0.125W
3261	4822 051 51002	1k 1% 0.125W
3262	4822 051 51004	100k 1% 0.125W
3273▲	4822 051 10103	10k 2% 0.25W
3275	4822 051 10221	220Ω 2% 0.25W
3280▲	4822 051 10103	10k 2% 0.25W
3289	4822 116 52215	220Ω 5% 0.5W
3291	4822 051 10008	0Ω 5% 0.25W
3292	4822 051 10008	0Ω 5% 0.25W
3340	4822 051 10824	820k 2% 0.25W
3341	4822 051 51503	15k 1% 0.125W
3342	4822 051 51005	1M 1% 0.125W
3345	4822 116 52263	2k7 5% 0.5W
3351	4822 051 51503	15k 1% 0.125W
3353	4822 051 10824	820k 2% 0.25W
3354	4822 100 11483	10k 30% 0.1W
3355	4822 051 10008	0Ω 5% 0.25W
3370	4822 116 52222	390Ω 5% 0.5W
3371	4822 116 52264	27k 5% 0.5W
3401	4822 116 52259	2k4 5% 0.5W
3402	4822 116 52222	390Ω 5% 0.5W
3403	4822 116 52276	3k9 5% 0.5W
3404	4822 051 10202	2k 2% 0.25W
3405	4822 051 10159	150Ω 2% 0.25W
3406	4822 116 52238	12k 5% 0.5W
3407	4822 116 52251	18k 5% 0.5W
3408	4822 050 11002	1k 1% 0.4W
3410	4822 101 11201	330Ω 30%
3411	4822 117 11554	2Ω7 5% 0.2W
3412	4822 117 11554	2Ω7 5% 0.2W
3415▲	4822 052 11471	470Ω 5% 0.5W
3440	4822 116 52199	68Ω 5% 0.5W
3442	4822 051 10562	5k6 2% 0.25W
3444	4822 053 11562	5k6 5% 2W
3445	4822 051 10479	47Ω 2% 0.25W
3448▲	4822 052 10228	2Ω2 5% 0.33W
3449▲	4822 052 11108	1Ω 5% 0.5W
3451	4822 116 52271	33k 5% 0.5W
3455	4822 116 52245	150k 5% 0.5W
3456	4822 116 52245	150k 5% 0.5W
3457▲	4822 052 11519	51Ω 5% 0.5W
3458▲	4822 052 11519	51Ω 5% 0.5W
3460▲	4822 051 10103	10k 2% 0.25W
3470▲	4822 052 10478	4Ω7 5% 0.33W
3501▲	4822 116 40137	PTC 36Ω 365V
3504▲	4822 053 21106	10M 5% 0.5W
3507	4822 053 11154	150k 5% 2W
3508	4822 116 52215	220Ω 5% 0.5W
3509	4822 116 80175	4k7 5% 0.5W
3512	4822 116 90173	10k 5% 0.5W
3513	4822 116 52234	100k 5% 0.5W
3516	4822 053 11104	100k 5% 2W
3517	4822 116 52289	5k6 5% 0.5W
3518	4822 100 11212	2k2 30% lin 0.1W
3519	4822 116 52245	150k 5% 0.5W
3520	4822 116 52245	150k 5% 0.5W
3521	4822 117 11557	12Ω 5% 0.2W
3523▲	4822 052 10339	33Ω 5% 0.33W
3524	4822 050 13904	390k 1% 0.4W
3525	4822 050 13904	390k 1% 0.4W
3527	4822 116 52175	100Ω 5% 0.5W
3528	4822 116 52175	100Ω 5% 0.5W
3560	4822 051 10008	0Ω 5% 0.25W
3580▲	4822 051 10103	10k 2% 0.25W
3581▲	4822 051 10103	10k 2% 0.25W
3582	4822 051 10332	3k3 2% 0.25W
3601	4822 116 52233	10k 5% 0.5W
3602	4822 116 52303	8k2 5% 0.5W
3603	4822 051 10243	24k 2% 0.25W
3604	4822 051 51501	150Ω 1% 0.125W
3605	4822 051 10224	220k 2% 0.25W
3606▲	4822 051 10103	10k 2% 0.25W
3607	4822 051 10332	3k3 2% 0.25W
3610	4822 051 51503	15k 1% 0.125W
3611▲	4822 051 10103	10k 2% 0.25W
3612▲	4822 051 10103	10k 2% 0.25W
3613	4822 116 52271	33k 5% 0.5W
3614	4822 051 54702	4k7 1% 0.125W
3615	4822 050 11002	1k 1% 0.4W
3616	4822 116 52284	47k 5% 0.5W
3617	4822 051 10224	220k 2% 0.25W
3618	4822 116 52234	100k 5% 0.5W
3620	4822 116 52271	33k 5% 0.5W
3623	4822 051 10223	22k 2% 0.25W
3624	4822 051 10333	33k 2% 0.25W
3625	4822 051 10223	22k 2% 0.25W
3626	4822 051 51004	100k 1% 0.125W
3627	4822 051 51004	100k 1% 0.125W
3628	4822 051 10183	18k 2% 0.25W
3630	4822 051 10474	470k 2% 0.25W
3631	4822 051 10364	360k 2% 0.25W
3651▲	4822 051 10103	10k 2% 0.25W
3652	4822 116 52237	1k2 5% 0.5W
3653	4822 116 52237	1k2 5% 0.5W
3654	4822 051 10008	0Ω 5% 0.25W
3655	4822 051 51002	1k 1% 0.125W
3656	4822 116 52276	3k9 5% 0.5W
3657	4822 051 10683	68k 2% 0.25W
3658	4822 051 10272	2k7 2% 0.25W
3659	4822 051 10821	820Ω 2% 0.25W
3660	4822 051 51001	100Ω 1% 0.125W
3662	4822 050 11002	1k 1% 0.4W
3663	4822 116 52211	150Ω 5% 0.5W
3664	4822 116 52271	33k 5% 0.5W
3665	4822 051 51002	1k 1% 0.125W
3666	4822 116 52211	150Ω 5% 0.5W
3667	4822 116 80173	10k 5% 0.5W
3668	4822 051 10433	43k 2% 0.25W
3669▲	4822 051 10103	10k 2% 0.25W
3670	4822 116 80173	10k 5% 0.5W
3676	4822 116 90173	10k 5% 0.5W
3679	4822 051 51802	1k8 1% 0.125W
3684	4822 051 10332	3k3 2% 0.25W
3685	4822 051 10332	3k3 2% 0.25W
3686	4822 051 51002	1k 1% 0.125W
3687	4822 116 52207	1k2 5% 0.5W
3688	4822 051 10225	2M2 5% 0.25W
3689	4822 051 51004	100k 1% 0.125W
3690	4822 051 51002	1k 1% 0.125W
3691	4822 116 80173	10k 5% 0.5W
3692	4822 051 51002	1k 1% 0.125W
3693	4822 116 52284	47k 5% 0.5W
3695	4822 051 51001	100Ω 1% 0.125W
3696	4822 051 51001	100Ω 1% 0.125W
3698	4822 051 51001	100Ω 1% 0.125W
3699	4822 051 54702	4k7 1% 0.125W
3902	4822 051 10008	0Ω 5% 0.25W
3904	4822 051 10008	0Ω 5% 0.25W

⌇

5010	4822 157 62552	2.2uH 10%
5015	4822 157 53939	10uH 10%
5029	4822 157 60123	6.8uH 10%
5032	4822 157 62767	3.2uH 10%
5040	4822 157 63064	0.19um adjust coil
5294	4822 152 20677	10uH 10%
5295	4822 152 20677	10uH 10%
5286	4822 152 20677	10uH 10%
5440	4822 157 52983	22uH 10%
5441	4822 146 21116	Line drive trafo
5443	4822 157 53063	47uH 10%
5445▲	4822 140 10505	Line output transformer
5447	4822 158 10551	27uH 7.5%
5449	4822 157 53063	47uH 10%
5500▲	4822 212 22978	Mains filter
5525▲	4822 148 81404	SOPS transformer
5531	4822 158 10551	27uH 7.5%
5532	4822 157 71387	100 MHz bead
5534	4822 157 71387	100 MHz bead
5540	4822 157 70698	27uH 10%
5541	4822 157 70698	27uH 10%
5550	4822 157 71387	100 MHz bead
5552	4822 157 71387	100 MHz bead
5560	4822 157 53939	10uH 10%
5601	4822 157 53939	10uH 10%
5652	4822 157 53939	10uH 10%
5653	4822 157 53939	10uH 10%
5677	4822 157 53906	47uH 10%

⊳|

6183	4822 130 80884	BZV55-C5V1
6205	4822 130 80446	BAS32L
6218	4822 130 80446	BAS32L
6227	4822 130 80446	BAS32L
6261	4822 130 83338	LL4148
6275	4822 130 80884	BZV55-C5V1
6289	4822 130 83338	LL4148
6370	4822 130 82882	BZV55-F8V2
6372	4822 130 82882	BZV55-F8V2
6415	4822 130 81223	BZV55-C2V4
6416	4822 130 42488	BYD33D
6417	4822 130 83338	LL4148
6443	4822 130 42488	BYD33D
6447▲	4822 130 32896	BYD33M
6449	4822 130 42488	BYD33D
6451	4822 130 42488	BYD33D
6470	4822 130 42488	BYD33D
6502	4822 130 31497	1N4005
6503	4822 130 31497	1N4005
6504	4822 130 31497	1N4005
6505	4822 130 31497	1N4005
6515▲	4822 130 30621	1N4148
6516▲	4822 130 32896	BYD33M
6521	4822 130 42488	BYD33D
6530	4822 130 32233	BYD34J
6540	4822 130 42488	BYD33D
6602	4822 130 32237	BZX79
6603	4822 130 83338	LL4148
6658▲	4822 130 30621	1N4148
6663▲	4822 209 30563	TLXR5400
6679	4822 130 83338	LL4148

Power supply + Synchronisation + Deflection

B

TP9 ⏀

0.2V / div DC
20µs / div

TP10 ⏀

2V / div DC
20µs / div

TP11 ⏀

1V / div DC
5ms / div

SMD COMPONENT
WIRE JUMPER
SMD JUMPER

	VERSION 14"	VERSION 28"
2404	1500uF	3300uF
2405	33uF	22uF
2446	8n2	10nF
2450	470nF	680nF
3404	2K	4K7
3405	15R	68R
3406	12K	18K
3411	2R7	2R2
3412	2R7	2R2
3460	10K	8K2
3480	-----	1K
5480	-----	AT4042/92
9480	JMP	-----

-SYNC-

-LINE-

-FRAME-

POWER SUPPLY MEASURED 'N RESPECT TO ⏚ (..V) STANDBY

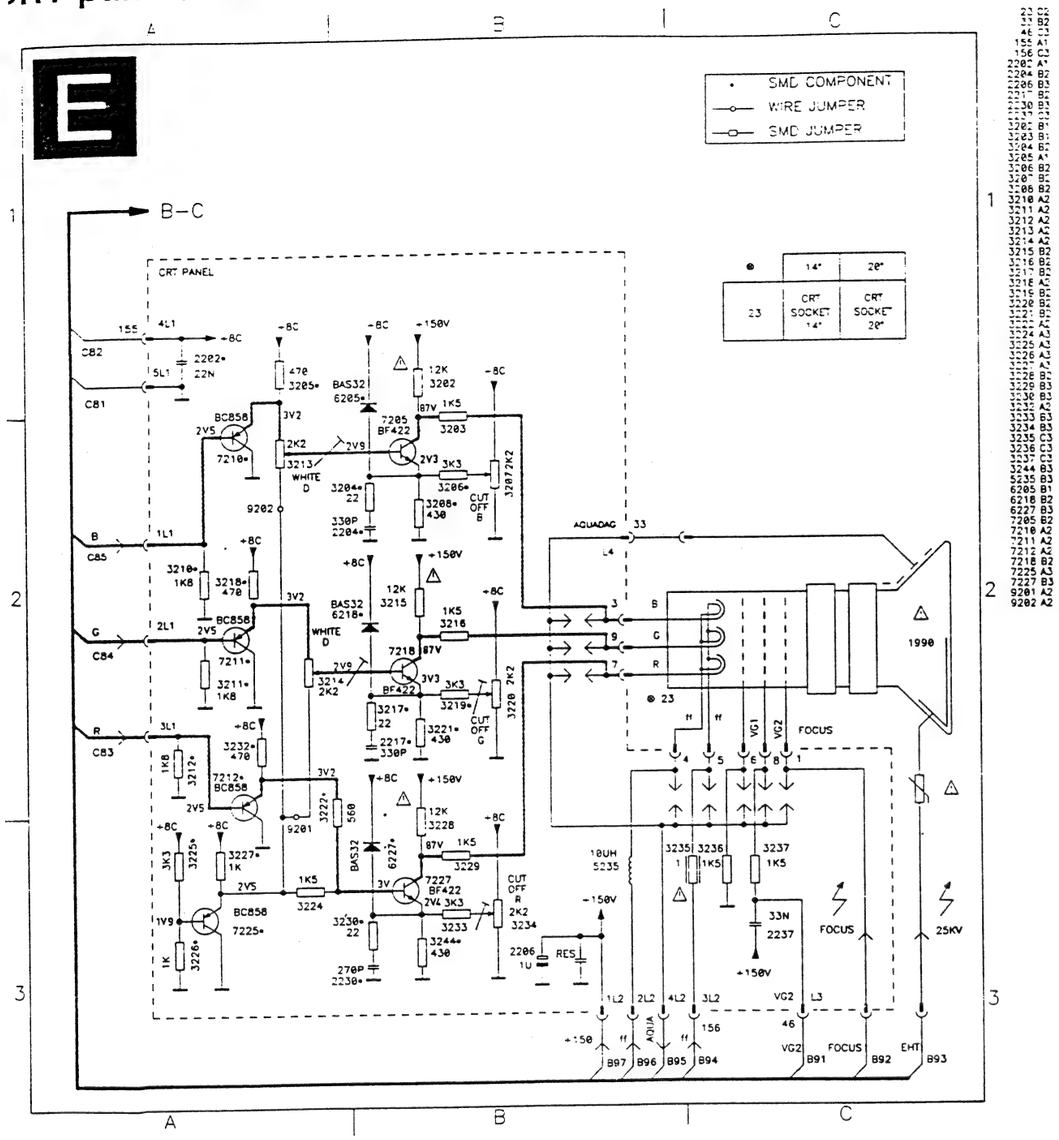
TP15 ⏀

10V / div DC
5ms / div

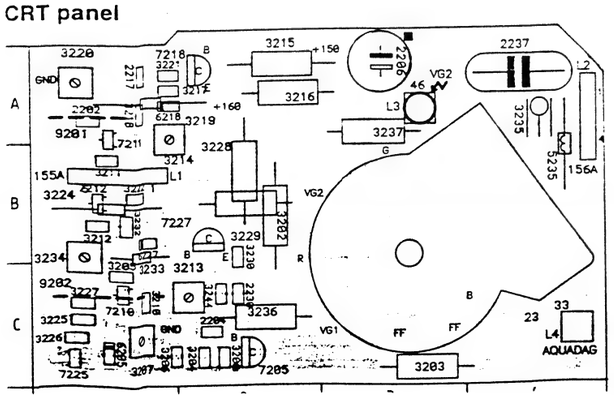
TP16 ⏀

5V / div DC
5ms / div

CRT panel / Panel CRT / Pannello CRT

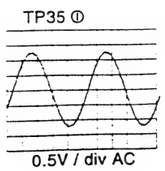


CRT panel



2202	A1	3208	C2	3221	A1	3236	C2	7212	B1
2204	C2	3210	C1	3222	B1	3236	C2	7218	A2
2206	A3	3211	B1	3224	B1	3237	A3	7225	C1
2217	A1	3212	B1	3225	C1	3244	C2	7227	B2
2230	C2	3213	C2	3226	C1	3293	B1	9201	A1
2237	A4	3214	A1	3227	C1	5235	B4	9202	C1
3202	B2	3215	A2	3228	B2	6205	C1	L1	B1
3203	C3	3216	A2	3229	B2	6218	A1	L2	A4
3204	C2	3217	A1	3230	B2	6227	B1	L3	A3
3205	C1	3218	A1	3232	B1	7205	C2	L4	C4
3206	C1	3219	A1	3234	B1	7210	C1		
3207	C1	3220	A1	3235	A4	7211	A1		

TP35 ①



0.5V / div AC
0.2ms / div

(I) ISTRUZIONI ELETTRICHE

A. REGOLAZIONI SUL PANELLO PRINCIPALE

1. Tensione di alimentazione +95 V
Collegare un voltmetro (DC) fra il +2530 e massa. Regolare con il potenziometro 3518 la tensione ad un valore di 95V per uno schermo da 14", 88V per uno schermo da 20" o 21".

2. Centraggio orizzontale
Da regolare con il potenziometro 3554.

3. Altezza dell'immagine
Da regolare con il potenziometro 3410.

4. Messa a fuoco
Da regolare con il potenziometro apposito nel trasformatore di linea.

5. CAF
Collegare un generatore di segnali (p.e. PM5326) come indicato nella Fig. 1 e regolare la sua frequenza a 38,9 MHz (PAL I: 39,5 MHz). Collegare un voltmetro sul perno 44 dell' IC7015:C e regolare la tensione con 5040 a 3,5V (CC).

6 C.A.G.–RF
Quando l'immagine di una potente transmittente locale risulta distorta, regolare il potenziometro 3021 finchè l'inconveniente sia rimediato.

B. REGOLAZIONE SUL CIRCUITO STAMPATO DELLO ZOCCOLO PER IL CINESCOPIO

1. Punto di interdizione del cinescopio
Applicare in antenna un segnale di quadro bianco.
Collegare il perno 25 dell' IC7015:E a massa.
Regolare la luminosità in modo che sul potenziometro 3214 una tensione continua di 0 V sia presente.
Tramite i potenziometri 3234, 3207 e 3220 regolare il livello del nero sui collettori dei transistors 7227, 7205 e 7218 ad un valore di 125 V per uno schermo da 14" o 21", 130 V per uno schermo da 20".
Agire sul potenziometro Vg2 fino a quando la luce proveniente dal cannone che si illumina come primo non sia appen appena visible.
Regolare gli altri due cannoni con i loro comandi rispettivi (3234, 3207 ó 3220) fino a quando la luce sparisca appen appena.

2. Scala dei grigi
Applicare in antenna il segnale campione e regolare normalmente i controlli del televisore.
Lasciare riscaldare l'apparecchio per almeno 10 minuti.
Regolare 3214 e 3213 finchè si ottiene la desiderata scala dei grigi.

△ REGOLAZIONI DELL'IMMAGINE

Nota:
Le regolazioni di purezza colore e di convergenza qui descritte devono essere eseguite solo in caso di sostituzione del cinescopio o comunque se necessita una regolazione completa. In tutti gli altri casi anche in caso di sostituzione del l'unità di deflessione non è necessario rimuovere i cunei di gomma (G. di Fig. 3), in quanto è sufficiente l'unità multipolare per apportare piccole correzioni.

I. Purezza colore, Fig. 3

1. Allentare di alcuni giri la vite "F" di fissaggio del giogo di deflessione.
2. Muovere il giogo e togliere i tre cunei di gomma G.
3. Far slittare il giogo il più possible contro l'ampolla del cinescopio ed avvitare la vite "F" in modo che il giogo si possa spostare con una certa frizione.
4. Posizionare l'unità multipolare come da figura, avvitare la vite "A" e ruotare in senso antiorario l'anello di sicurezza "B".
5. Posizionare il televisore col frontale verso EST o verso OVEST ed inserirlo.
   Mettere in antenna un segnale di reticolo e portare al massimo la luminosità. Far riscaldare il televisore per circa 10 minuti.
6. Regolare la convergenza statica, usando le alette "C" e "D" (se necessario o consultare il capitolo II).
7. Interdire il cannone del verde e del blu scollegando rispettivamente le resistenze 3216 e 3203.
8. Ruotare gli anelli di purezza colore con le alette "E" in modo che la barra rossa verticale coincida il più. possibile col centro dello schermo e nel contempo fare in modo che la linea centrale orizzontale sia più diritta possibile.
9. Inserire un segnale di quadro bianco e controllare che la barra rossa verticale sia sul centro dello schermo. Se ciò non è stato realizzato, inserire nuovamente un segnale di reticolo e spostare la barra rossa verticale nella giusta direzione facendo attenzione che l'immagine non si sposti molto di verticale.
10. Inserire il segnale di quadro bianco e spostare il giogo di deflessione fino a quando l'intero schermo sia uniformemente rosso.
11. Inserire i cannoni del verde e del blu ed osservare che nessuna macchia vada a inquinare lo schermo bianco ottenuto. Se ciò accade si possono eseguire leggere correzioni ruotando gli anelli "E" e/o spostando il giogo di deflessione.
12. Avvitare la vite "F".
13. Procedere alla regolazione della convergenza statica e dinamica.

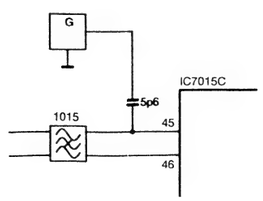


Fig. 1

II. Convergenza statica, vedere Fig. 3

1. Inserire un segnale di reticolo e lasciar riscaldare il televisore per circa 10 minuti.
2. Interdire il cannone del verde scollegando 3216 e ruotare l'anello di fissaggio "B" in senso antiorario.
3. Ruotare gli anelli magnetici a quattro polarità con le alette "C" in modo da sovrapporre i reticoli blu e rosso sul centro dello schermo.
4. Inserire il cannone del verde ed interdire il cannone del blu scollegando la resistenza 3203.
5. Ruotare gli anelli magnetici a 6 polarità con le alette "D" in modo da sovrapporre i reticoli rosso e verde sul centro dello schermo.
6. Inserire il cannone del blu e fissare l'unitá multipolare con l'anello "B".

III. Convergenza dinamica

Nota:
La convergenza dinamica si ottiene spostando il giogo di deflessione in senso orizzontale e verticale. Per assicurare l'esatta posizione dell' unità di deflessione, tre cunei di gomma sono posti tra il vetro dell'ampolla del cinescopio ed il giogo stesso, come ilustrato in Fig. 4a o 5d.
Due di questi cunei hanno uno spessore di 7 mm. Codice 4822 462 40356, l'altro ha uno spessore di 11 mm, numero di codice 4822 462 40357.

1. Controllare prima la purezza colore e la convergenza statica.
2. Inserire un segnale di reticolo ed interdire il cannone del verde scollegando la resistenza 3216.
3. Eliminare l'incrocio delle righe centrali orizzontali e verticali blu e rosse con uno spostamento verticale del giogo. Se la posizione del giogo è corretta, inserire il cuneo di gomma (1) in alto (Fig. 4a) o in basso (Fig. 5a) senza togliere la striscietta di carta.
   L'inserzione del cuneo come da Fig. 4a va eseguita se il giogo è spostato verso l'alto, come da Fig. 5a se il giogo è spostato verso il basso.
4. Spostando il giogo in senso orizzontale si ottiene la sovrapposizione delle righe orizzontali rosse e blu nella parte superiore e inferiore delio schermo e delle righe verticali rosse e blu a sinistra e a destra.
   Se la posizione del giogo è corretta, posizionare i cunei (2) e (3) togliendo la striscia di carta, come indicato in Fig. 4b o 5b. Premere con decisione la parte adesiva di questi cunei contro il vetro del cinescopio.
5. Posizionare ora il cuneo (4) come in Fig. 4c o 5c e premere in modo che aderisca al cinescopio.
6. Togliere il cuneo (1) in modo da ottenere la situazione illustrata in Fig. 4d o 5d.
7. Inserire il cannone del verde.

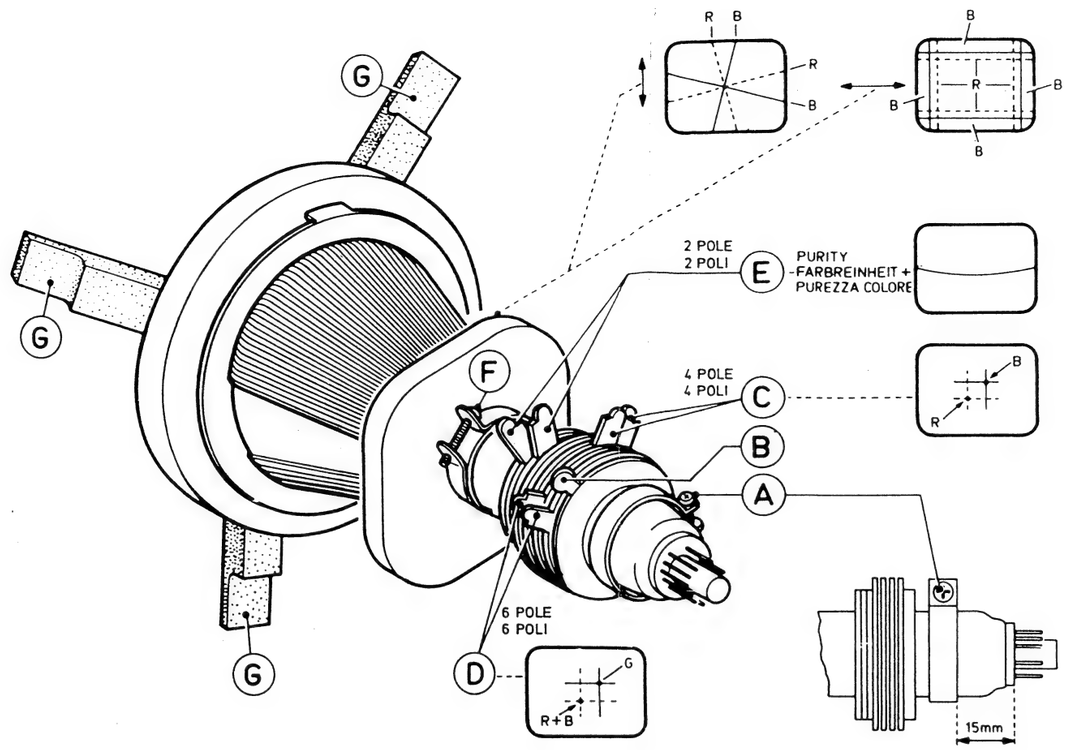


Fig. 3

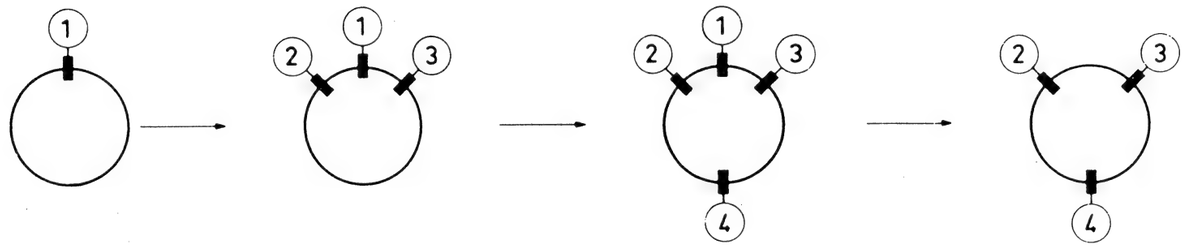


Fig. 4a Fig. 4b Fig. 4c Fig. 4d

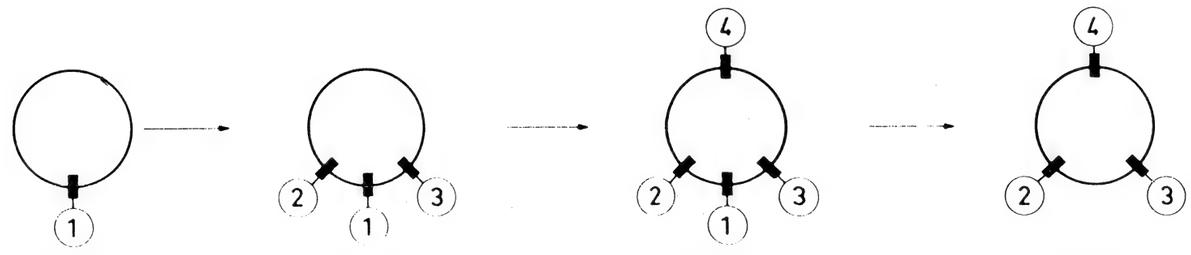
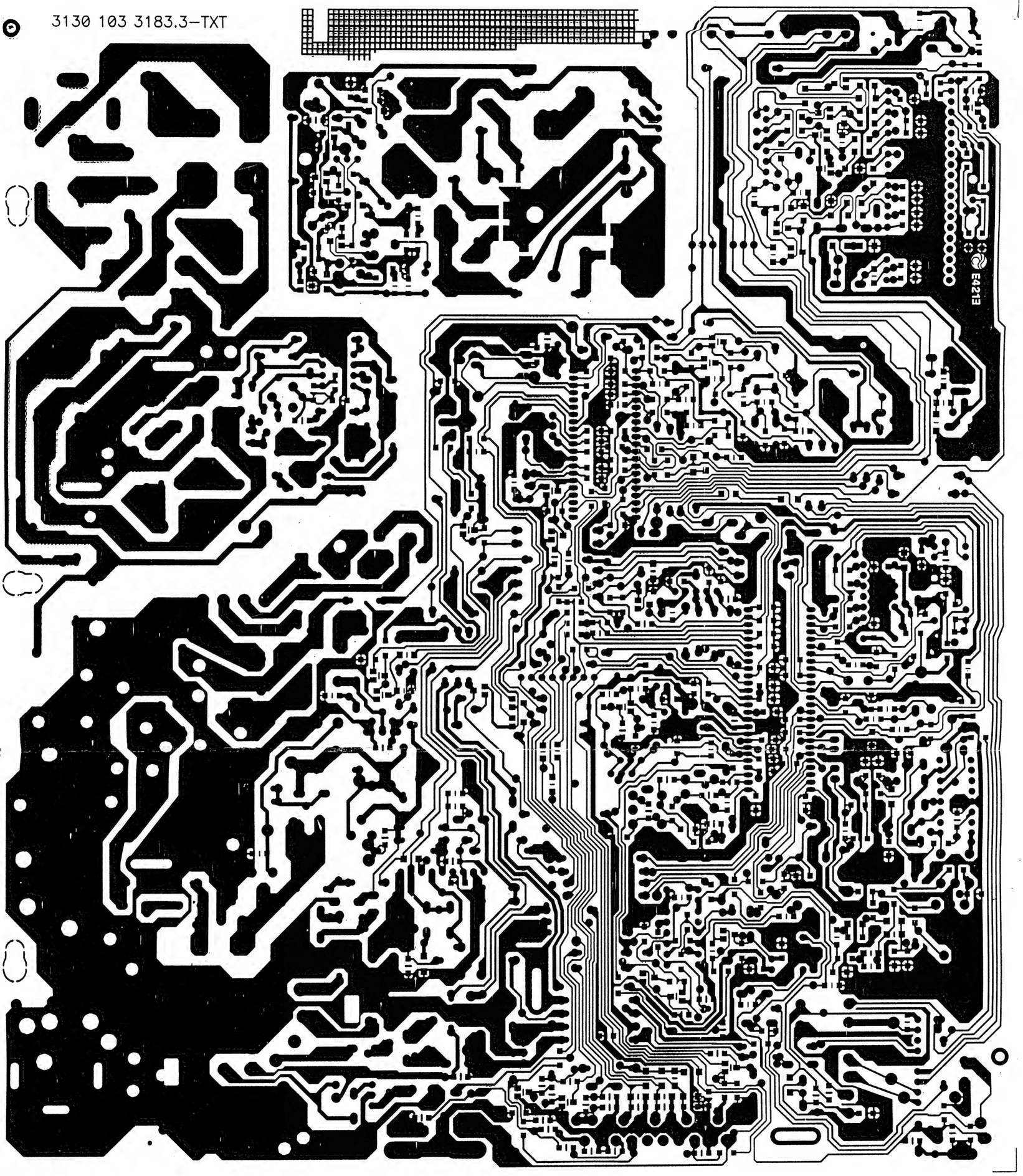


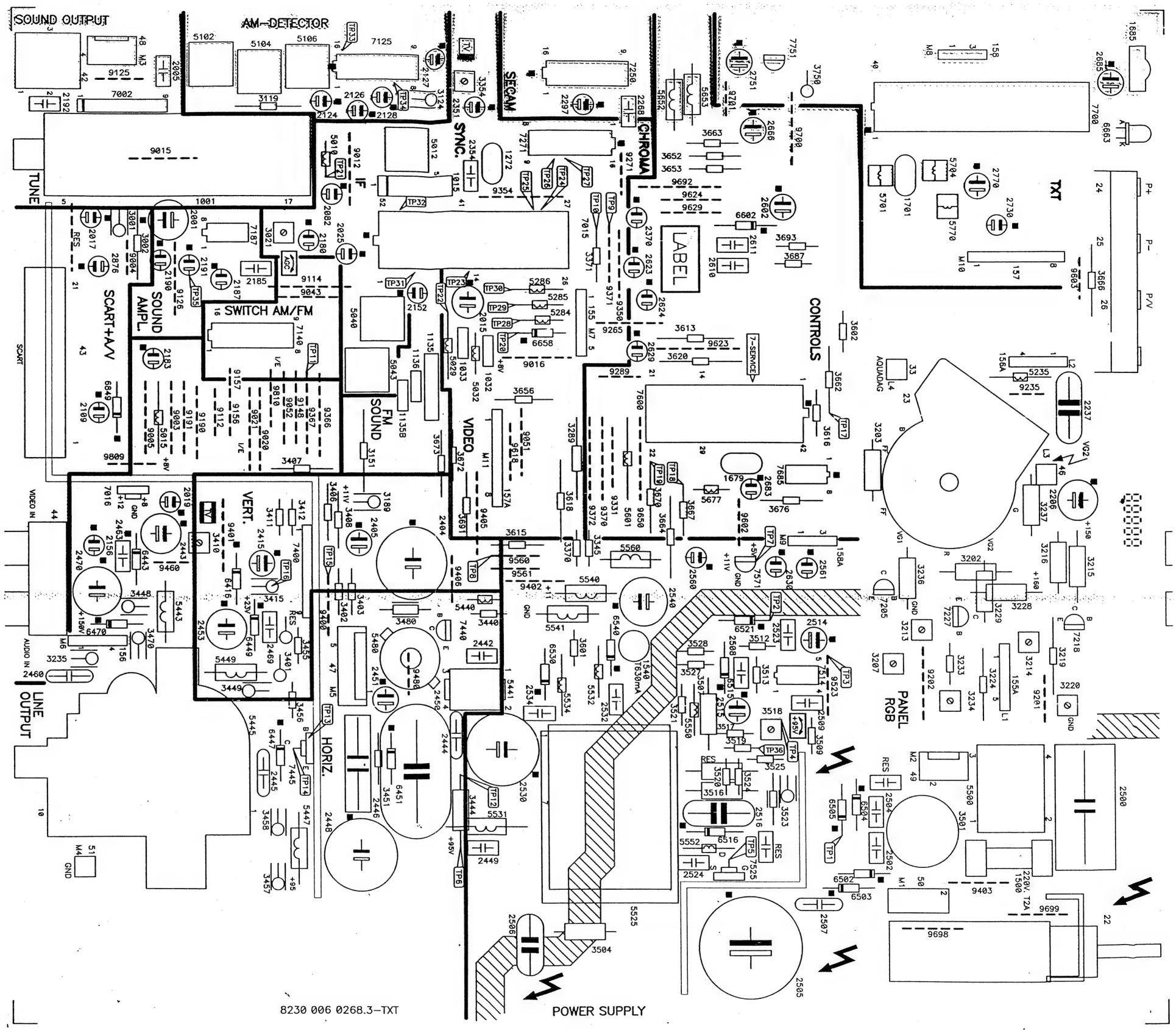
Fig. 5a Fig. 5b Fig. 5c Fig. 5d

38 046 E12

3130 103 3183.3–TXT



8230 006 0265.3–TXT



8230 006 0268.3–TXT

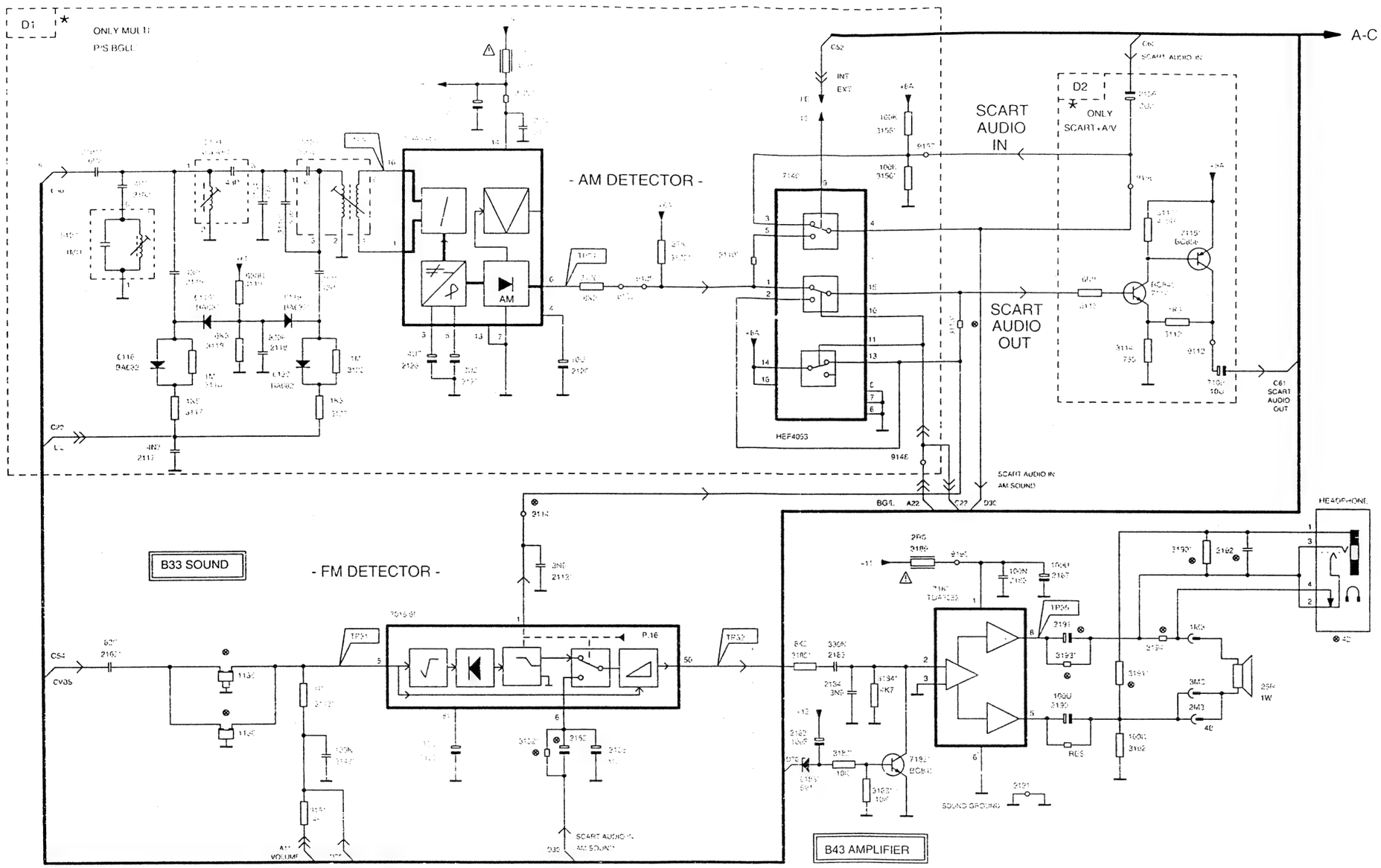


DIAGRAM D

SMD COMPONENT
WIRE JUMPER
SMD JUMPER

⊗	WITH SCART-A/V	WITHOUT SCART-A/V
2132	1U	...
3113	JMP	...
3132	...	0R56
9114	JMP	...

⊗	WITH HEADPHONE	WITHOUT HEADPHONE
2191	100U	...
2192	10N	...
3190	68R	...
3191	68R	...
3193	...	JMP
3194	...	JMP
42	SOCKET	...

⊗	PAL BG	PAL I	PAL/SECAM BG-DK	PAL SECAM I-BG-L
1135	5.5M	6.0M	5.5M	5.5M
1136	...	...	6.5M	6.5M

42	E5
48	E2
1135	B5
1136	B5
2101	A2
2102	A5
2104	B2
2109	E2
2110	B2
2112	C5
2115	B2
2117	B2
2118	B2
2120	B2
2124	C1
2125	C1
2126	B2
2127	C2
2128	C2
2143	B3
2152	C3
2155	C3
2156	E1
2169	A3
2180	C5
2183	D3
2184	D3
2185	D3
2187	E3
2188	E5
2190	E5
2191	E5
2192	E4
3110	D2
3111	E2
3112	E2
3113	D2
3114	E2
3115	E2
3116	B2
3117	B2
3118	B2
3119	B2
3120	B2
3124	C1
3125	C2
3126	C2
3127	B2
3125	C1
3143	B4
3151	B5
3152	C3
3155	D1
3156	D1
3182	D4
3183	D4
3184	D5
3185	D3
3189	D3
3190	E3
3191	E3
3192	E5
3193	E3
3194	E3
3195	E3
5102	A2
5104	B2
5106	B2
6115	B2
6116	A2
6119	B2
6120	B2
6183	D3
7015	C3
7114	E2
7115	E2
7125	C2
7140	D2
7183	D4
7187	D3
9112	E2
9114	C3
9125	C2
9126	C2
9148	D3
9156	E2
9157	D2
9190	E4
9191	D3

DIAGRAM C

C1 ONLY MULTI P/S BGLL

C2 ONLY SECAM

C3 ONLY SCART - A/V

- IF -

- CHROMA -

A80 IF/CHROMA/VIDEO

A40 TUNE

A-B-D-E

I50 SCART +AV

SMD COMPONENT
WIRE JUMPER
SMD JUMPER

	PAL BG	PAL-I	PAL/SECAM BG-DK	PAL SECAM I-BG-LL
1001	UV917E	U943C	UV917E	UV915E
1015	OFWG1961	OFWJ1951	OFWK2950	OFWG3950
1032	5.5MHz	...	5.5MHz	5.5MHz
1033	...	6.0MHz	6.5MHz	6.0MHz
2017	47U	47U	47U	100U
3003	...	JMP	...	...
3010	JMP	JMP	JMP	56R
3019	180R	180R	180R	5K6
3261	...	1K	1K	...
5040	OMUH19	OMUH19	OMUH19	OMUH3
6020	...	...	...	2V4
7002	LA7910	...	LA7910	LA7910
7015	TDA8360	TDA8360	TDA8362	TDA8362

	WITH TXT	WITHOUT SCART+AV+TXT
3291	...	JMP
3292	...	JMP
2291	100N	...
2292	100N	...
2293	100N	...

	WITH SCART+A/V	WITHOUT SCART-A/V
2007	47N	...
2290	...	100U
3034	JMP	...
3261	...	1K
7015	TDA8361	TDA8360
9051	JMP	...
2291	100N	...
2292	100N	...
2293	100N	...
6261	...	LL4148

0043	D3
1001	A3
1015	B2
1032	C2
1033	C2
1272	D3
2001	A3
2005	B4
2006	B4
2007	C2
2010	A2
2011	A2
2013	A2
2014	A2
2015	C3
2016	C3
2017	B3
2018	B2
2019	C1
2020	C1
2022	B3
2025	B3
2030	C1
2034	C2
2037	C1
2041	A1
2043	A1
2044	A1
2045	B1
2050	C2
2053	C2
2080	D3
2081	D3
2082	C3
2084	C3
2261	E2
2262	E2
2265	D3
2267	D2
2268	D2
2271	D1
2272	E1
2273	E1
2274	E1
2275	F1
2279	F2
2280	F2
2284	F2
2285	F2
2286	F2
2290	E3
2291	E3
2292	E3
2293	E3
2297	D1
2850	D4
2852	E4
2860	D3
2876	F4
3001	A3
3002	A4
3003	A4
3010	A2
3011	A2
3012	A2
3017	B2
3018	B3
3019	B2
3020	B2
3021	B3
3022	B3
3029	C2
3030	C1
3031	C2
3032	C2
3033	C2
3034	C1
3042	A1
3043	A1
3044	A1
3049	A2
3053	A2
3080	D3
3260	D3
3261	F2
3262	E2
3272	E1
3273	E1
3275	F1
3280	D2
3289	F3
3291	E3
3292	E3
3355	C1
3850	D4
3851	E3
3852	E4
3853	E3
3854	D4
3855	E3
3858	E3
3860	D3
3862	E3
3865	F3
3871	F4
3875	F4
3876	F4
3878	E4
3879	E4
3880	E4
3881	E4
3882	E4
3883	E4
3884	F4
5010	A2
5012	A2
5015	C1
5029	C2
5032	C2
5040	B1
5043	A1
5284	F2
5285	F2
5286	F2
6014	A2
6020	B3
6042	A1
6261	F2
6275	F1

DIAGRAM B

SMD COMPONENT
WIRE JUMPER
SMD JUMPER

	VERSION 1*	VERSION 2*
2404	1500uF	3300uF
2405	33uF	22uF
2440	6n2	10nF
2450	470nF	680nF
3404	2K	4K7
3405	15R	6R8
3406	12K	18K
3411	2R7	2R2
3412	2R7	2R2
3460	10K	6K2
3480	.....	1K
5480	.....	AT4042-9
9486	JMP	.....

A80 SYNC

-SYNC-

F30 POWER SUPPLY

-FRAME-

E33 LINE

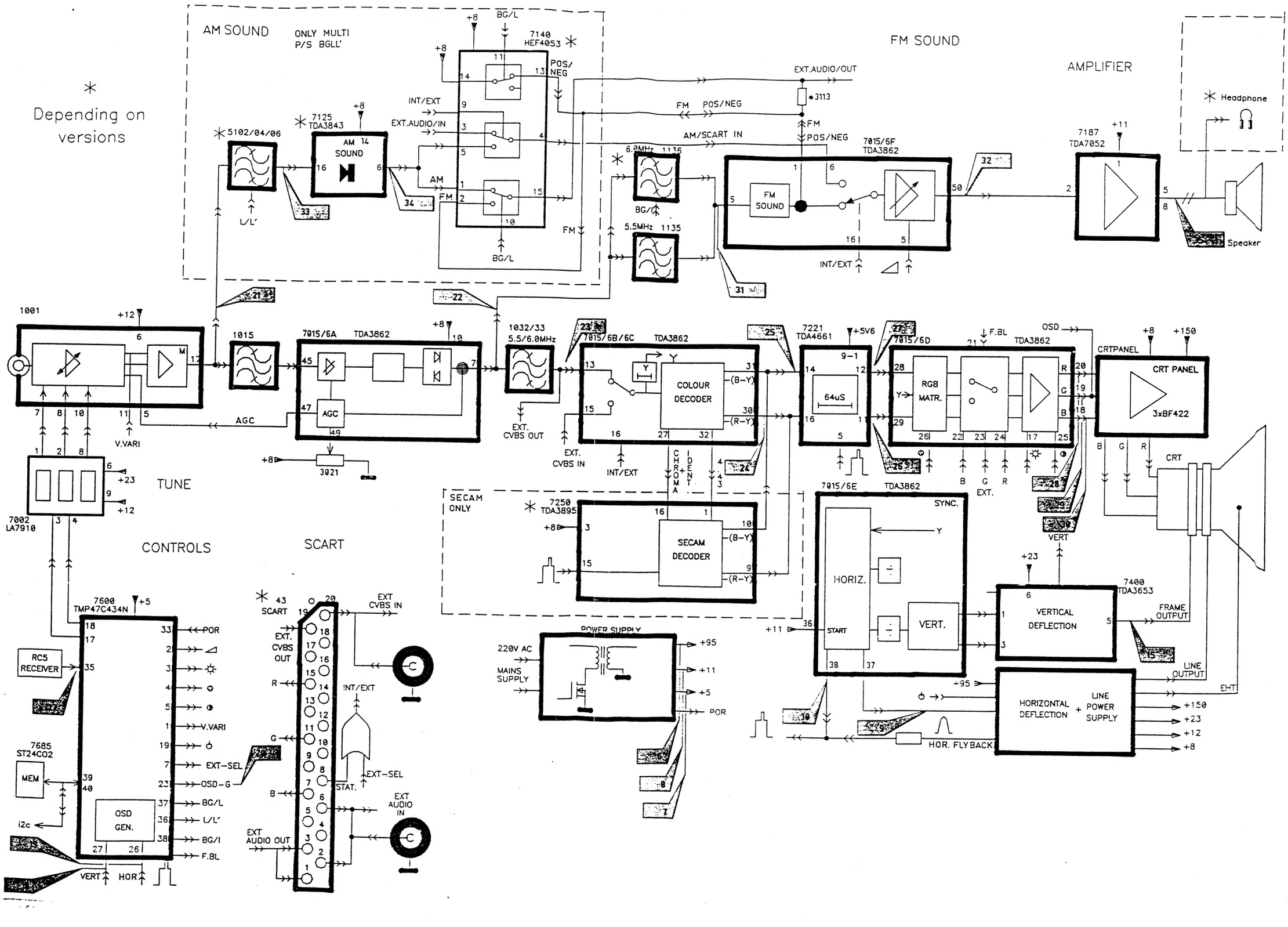
E30 FRAME

A-C-E

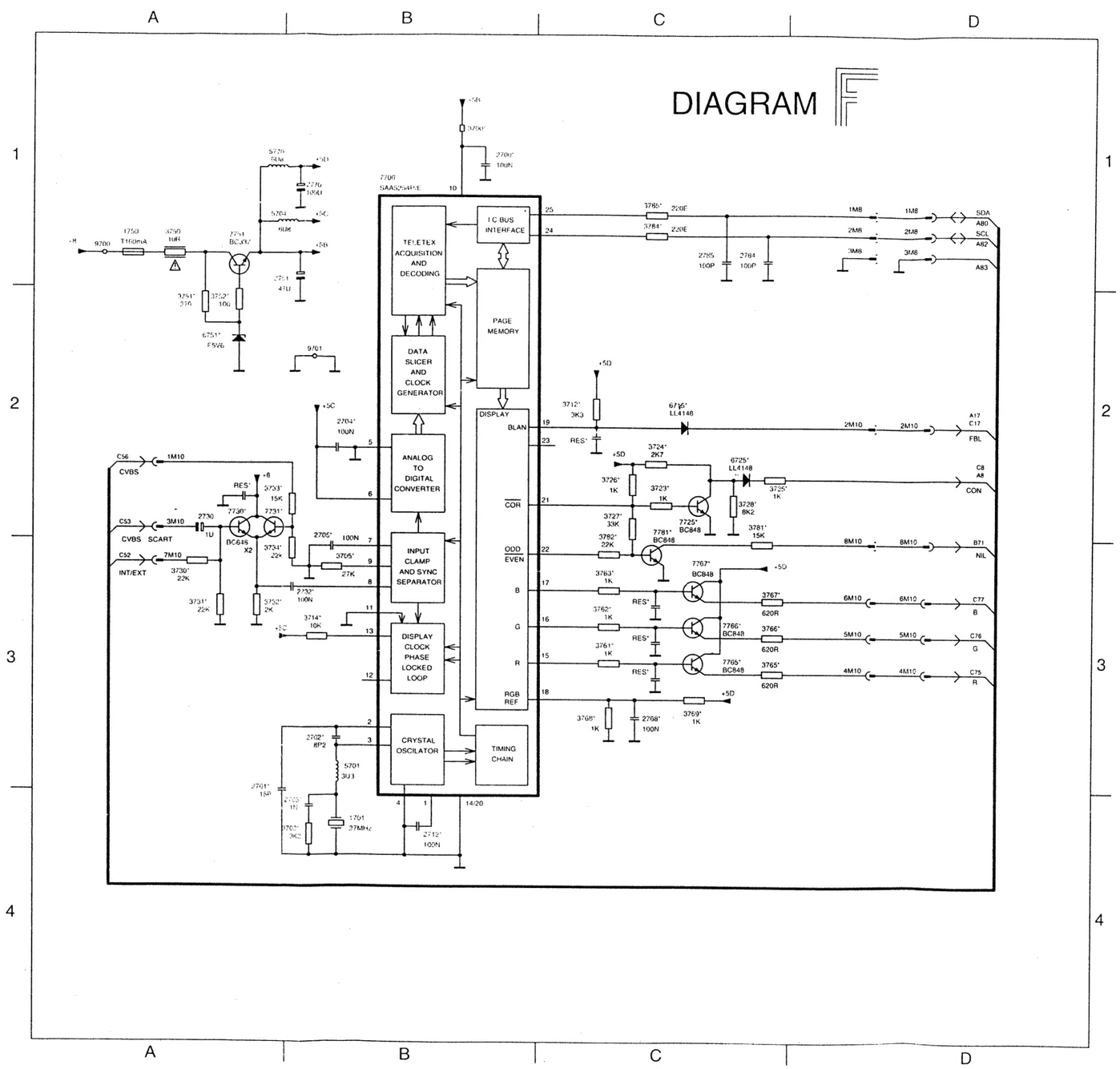
22	A3	6540	C4
47	E1/E3	7400	D3
49	B3	7440	D2
50	A3	7445	E2
1500	A3	7514	A3
1540	C4	7525	B3
2340	B2	7571	C3
2350	A2	7580	C3
2351	A2	7581	C3
2354	B2	9331	B2
2366	B2	9350	B2
2370	B2	9354	A1
2371	B2	9366	A2
2401	D3	9367	B2
2402	E3	9370	B2
2404	E4	9371	B2
2405	F4	9372	C2
2414	D3	9400	E3
2415	E3	9401	F2
2416	E3	9402	D4
2440	D2	9405	F3
2442	D2	9406	F3
2443	F2	9460	F1
2444	D2	9480	E1
2445	E2	9503	A3
2446	E2	9560	C4
2448	E1	9561	C4
2449	E1		
2450	D1		
2451	D1		
2453	F2		
2460	F1		
2463	F2		
2469	F2		
2470	E1		
2500	A3		
2502	B3		
2504	B3		
2505	B3		
2506	B4		
2507	B4		
2508	B4		
2509	B3		
2510	B4		
2514	B4		
2515	B4		
2516	B3		
2520	B4		
2522	B3		
2523	A4		
2524	B3		
2530	C3		
2532	C4		
2534	C3		
2540	C4		
2560	C3		
2561	C3		
3340	B2		
3341	B2		
3342	B2		
3345	D2		
3351	A2		
3353	E1		
3354	B2		
3370	C2		
3371	C2		
3401	E3		
3402	E3		
3403	F3		
3404	F4		
3405	F4		
3406	F4		
3407	F4		
3408	D3		
3410	F4		
3411	F4		
3412	E4		
3415	E3		
3440	D2		
3442	D2		
3444	D2		
3445	E2		
3448	E2		
3449	E2		
3451	D2		
3455	D1		
3456	D1		
3457	E1		
3458	E1		
3460	F1		
3470	E1		
3480	E1		
3501	B3		
3504	A3		
3507	A3		
3508	B4		
3509	A3		
3510	B4		
3512	B4		
3513	B4		
3516	B3		
3517	B4		
3518	B4		
3519	A3		
3520	A3		
3521	B4		
3522	B3		
3523	B3		
3524	A3		
3525	A3		
3526	B3		
3527	B4		
3528	B4		
3560	C3		
3580	D3		
3581	C3		
3583	D2		
5440	D2		
5441	D2		
5443	E2		
5445	E1		
5447	E1		
5449	E2		
5480	E1		
5500	A3		
5525	C3		
5531	C3		
5532	C4		
5534	C3		
5540	C4		
5541	C4		
5550	B4		
5552	B3		
5560	C3		
6370	B2		
6372	C2		
6415	E3		
6416	E3		
6417	D3		
6443	F2		
6447	E2		
6449	F2		
6451	D2		
6470	E1		
6502	B3		
6503	B3		
6504	B3		
6505	B3		
6515	B4		

Block diagram / Diagrama de bloques / Diagramma a blocchi

CHASSIS CTT-H 5



DIAGRAM



1701	B4
2700	B1
2701	B3
2702	B3
2703	B4
2704	B2
2705	B3
2712	B4
2730	A2
2731	B3
2751	B1
2768	C3
2770	B1
2784	D1
2785	D1
3700	B1
3702	B4
3705	B3
3712	C2
3714	B3
3723	C2
3724	C2
3725	C2
3726	C2
3727	C2
3728	C2
3730	A3
3731	A3
3732	A3
3733	B2
3734	B3
3750	A1
3751	A2
3752	A2
3761	C3
3762	C3
3763	C3
3765	C3
3766	C3
3767	C3
3768	C3
3769	C3
3781	C3
3782	C3
3784	C1
3785	C1
5701	B3
5704	A1
5770	A1
6715	C2
6725	C2
6751	A2
7700	B1
7725	C2
7730	A2
7731	A2
7751	A1
7765	C3
7766	C3
7767	C3
7781	C3
9700	A1
9701	B2